APPENDIX F

HABITAT QUANTIFICATION

Schenimann Chute
Environmental Enhancement Program
Habitat Rehabilitation and Enhancement Project
Habitat Quantifications

INTRODUCTION

This appendix provides a quantification of habitat conditions for project planning. Quantification is needed to evaluate project features where traditional benefit/cost evaluation procedures are not applicable. Currently, the unit of measure that has gained the widest acceptance among technical and policy elements, both within and outside the Corps, is the habitat unit (HU). Habitat units have been used to evaluate the Schenimann Chute Environmental Management Program (EMP) Habitat Rehabilitation and Enhancement Project (HREP). A habitat unit is the product of an estimated acreage for a given habitat type multiplied by a habitat suitability index (HSI) value for that habitat type. Habitat Suitability Indices result from the numeric ranking of site characteristics at sample sites for a habitat throughout a given project area. Habitat Units can be annualized (Average Annual Habitat Unit, or AAHU) for specific target years to project changes in habitat values over time. The effects of various plans or plan features can then be compared by applying the HSI's to the acreages of habitat for each alternative considered.

There is a need for fisheries and aquatic wildlife based HU accounting methodologies for the Schenimann Chute Project. A number of such methodologies are available, but the Habitat Evaluation Procedure (HEP) developed by the U. S. Fish and Wildlife Service (1980) is one of the most familiar to all participants in the Upper Mississippi River System (UMRS). This was the method of choice for the wildlife habitat evaluation at Schenimann Chute. The HEP models chosen for this site were fine tuned where needed by the habitat analysis group in order to account for regional attributes.

HU methodologies for wildlife evaluation have been used for some time resulting in greater support and acceptance among biologists than the more recently developed fisheries evaluation methods. Two fisheries evaluation methods have been used on EMP projects on the UMRS, these are the Aquatic Habitat Appraisal Guide (AHAG) developed by the Waterways Experiment Station (WES) and the Corps' Rock Island District (1996), and the Fisheries Habitat Appraisal Guide (FHAG) developed by the Missouri Department of Conservation (19xx). Both methods follow the format of the Missouri WHAG. Elements from each of these models were incorporated into the habitat analysis completed for Schenimann Chute, and fine tuned for regional accuracy.

The habitat appraisal team included representation from the U.S. Fish and Wildlife Service (USFWS), the Missouri Department of Conservation, and the Corps of Engineers (COE).

Table 1. Habitat appraisal team.

Schenimann Chute HREP Habitat Appraisal Team			
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EXISTING, FUTURE WITH, AND FUTURE WITHOUT CONDITIONS

Habitat quantification was based upon the desire to breathe new life into a degraded Schenimann Chute. The Schenimann Chute side channels has been degraded by the accumulation of sediment and, without action, will become part of the adjacent land, thus eliminating an important habitat component of the open river ecosystem. The goals of the project are to maintain a river connection to Schenimann during seasonal low flows, and reestablish the ability of water to flow unimpeded from its entrance to its mouth. This will be done in order to allow aquatic organisms access to important sidechannel habitat that currently is inaccessible during certain times of the year. It is believed that various aquatic organisms will use the area for different life stage requisites, such as spawning; larval and juvenile rearing, adult feeding; and over-wintering refuge. Different aquatic species and life stages may use different habitats in the unit at different times. Allowing different species and life stages to move out of and into the area at the proper times, therefore, is a major concern. By creating annual connectivity and adding structures within the chute to provide scour and meandering patterns will create a diversity of habitat, mainly depth and substrate diversity, which will be beneficial to a variety of aquatic organisms. Reestablishing a flow through system will provide for a turnover of water within the chute, providing a more inhabitable area for organisms during the hot summer months during low flow. By allowing connection during the winter, refuge within the chute will be accessible to fish seeking habitat off of the main channel.

The HEP and AHAG analysis have assumed that the greater benefits of this project would be experienced by Middle Mississippi River fish species since the project is focused within channel borders. The species utilized in the wildlife analysis included the false map turtle (*Graptemys pseudogeographica*) and the river otter (*Lutra Canadensis*). Though it was thought that benefits would not be greatly gained from these species, they are known to inhabit this type of habitat, and felt they would be most representative of wildlife that would possibly be using the area. The group felt that the Wildlife Habitat Appraisal Methodology (WHAG), which was created to evaluate wildlife habitat impacts in the general vicinity of the Upper Mississsippi River, the group agreed that the species represented in the WHAG matrix were more indicative of habitat changes in emergent wetland, forested wetland or upland settings, which are not representative of this project. The fish species that were utilized in the analysis included the smallmouth buffalo (*Ictiobus bubalus*), sauger (*Stizostedion canadense*), shovelnose sturgeon (*Scaphirhynchus platorynchus*), paddlefish (*Pylodon spathula*) and flathead catfish (*Pylodictis olivaris*). These species were selected because they are characteristic of the Middle Mississippi River, they cover three reproductive guilds and two habitat guilds, and they are considered important fishes from a recreational and commercial fishery standpoint. A guild is a group of species that exploit the same environmental resources (e.g. habitats) in similar ways (Root 1967). Habitat and reproduction are

considered to be the most appropriate factors for grouping species of fish together since the goal of the project is to provide spawning, rearing, and overwintering areas for fish. In the habitat unit analysis for this project, the habitat guilds of "lotic large fishes" , represented by smallmouth buffalo, paddlefish, and flathead catfish, and "lentic large fishes", represented by sauger and shovelnose sturgeon, were used for grouping and averaging benefits, since the project is designed to provide a diversity of flow throughout the side channel. While not evaluated, the project is also expected to produce benefits to the endangered pallid sturgeon (*Scaphirhynchus albus*).

WILDLIFE AND FISH HABITAT APPRAISAL METHODS

Wildlife - Habitat Evaluation Procedures are a proven approach to evaluating wildlife habitat quality, developing wildlife habitat management plans, assessing potential impacts of projects on wildlife, and designing ways to compensate for wildlife habitat losses associated with project impacts (USFWS, 1980). Since 1980, HEP has been used to assess wildlife impacts of projects in nearly every state and Canadian province. HEP is based on the assumption that habitat can be numerically described by HSI's calculated from species-habitat models. HEP models identify primary life requisites for the particular species being evaluated and then identify particular habitat elements that relate to these requisites. The models incorporate these habitat variables in determining the overall habitat suitability index of the site. The resulting index ranges from a low habitat suitability value of 0.1 to a high of 1.0. Listing of the appraisal guide items and potential ratings utilized in the HEP analysis for the river otter and false map turtle at Schenimann Chute are shown in table 2 and 3.

Fish – AHAG is based on the concept of the Habitat Evaluation Procedure (USFWS, 1980) and follows the format of the Wildlife Appraisal Guides (Basket et al., 1980). In addition, AHAG provides the flexibility to evaluate seasons and life stages (spawning – s, rearing – r, and juvenile/adult – j/a) for the indicator species. The AHAG models incorporate the habitat variables of the different life stages in determining the overall habitat suitability index of the site. The resulting index also ranges from a low habitat suitability value of 0.1 to a high of 1.0.

General - Computer results are provided for estimated total HU's and HSI's. The results can be used to assess the value of various proposed habitat improvements on habitat quality. HU's are annualized for target years in order to evaluate changes in project features over time. The target years selected for the Schenimann Chute project were current conditions (year 0), and 3, 25, and 50 years. These target years were selected because, after an analysis of past and estimated future habitat changes, it was projected that without a project the decline in habitat quality would be linear to the point of the chute being characteristic of terrestrial habitat within 25 years. However, with a project, it was felt that the conditions 25 years from now would be degraded nearly to what it is today, and then the second 25 years would lead to a nearly terrestrial condition. Year 3 was chosen because it was felt that with a project, habitat conditions would be the maximized rather quickly, and then steadily decline from that point.

PROJECT ALTERNATIVES ANALYZED

Habitat can potentially be improved by: (1) protecting habitat types considered critical, (2) altering habitat limiting factors, such as connection of a sidechannel to the main channel, (3) altering a management strategy, such as food crop composition, or (4) a combination of the above. In the case of Schenimann Chute, measures to improve the sidechannel included the notching of existing closure structures, the modification of existing dikes, addition of hardpoints and revetment, and dredging of areas that have been prone to sedimentation. It was important that the measures evaluated would create environmental diversity and enhancements while at the same time ensuring the integrity of the Mississippi River navigation channel. The following measures were combined to form the alternatives evaluated in this analysis:

- **Hard points/Notching** - The upper reaches of Schenimann Chute, between Miles 62.2 and 60.6, should be left unmodified. This reach contained adequate diversity because of the numerous bends located in this area. Also, construct a series of 15 alternating dikes or hard-points to an

elevation near top of bank in Schenimann Chute between Miles 60.5 to 59.0 to create additional physical and biological diversity, and to cause channel creation in some of the areas experiencing sedimentation. In addition, widen and deepen the existing notches in closure structures 59.8, 58.7, and 58.2 to allow better accessability throughout Schenimann Chute. Although the deepened notches were not tested in the micro model, experience has shown that this would not negatively impact the hydraulic or sediment transport characteristics of the side channel or the integrity of the navigation channel, but would provide for boat and fish passage during most river stages.

- **Dredging** - Artificially dredge the lower end of Schenimann chute to -3 LWRP to create connection to the main channel at the lower end and to provide deep-water habitat to fish. Dredging was simulated in the model and it appeared that dredge cuts would maintain themselves for a significant portion of the project life of 50 years. Various extents of this measure (based on the disposition of dike 57.9 mentioned below)were evaluated in the habitat analysis, but not the micro model. It was assumed during habitat analysis that the removal of entire pile dike may encourage additional deposition upstream of the pile dike in the future, but that a dredge cut to -3 LWRP would return to its current condition sometime around year 25 post project.
- **Pile Dike 57.9 Removal, Notching, or Leaving in Place** - To dredge the whole lower end to the first rock closure structure, the pile dike at RM 57.9 would have to be removed or notched to allow dredge access, so various alternative included the removal of, notching, or the leaving in place of this pile dike.
- **Dredge Material Placement into Thalwag or Chevron** – The placement of dredge material was a variable analyzed specifically in the habitat analysis. Placement into the thalwag would result in no positive or negative impacts to Schenimann Chute. Placement of spoil material behind a chevron would create island and sandbar habitat for fish, and the chevron would create a diversity of depths and substrates due to its impacts to velocities. A chevron does not currently exist near Schenimann Chute, so one would have to be constructed under that option. The chevron would be placed just down stream of Schenimann Chute in the main channel border area.
- **Changes in the alignment and notches in Dike 62.5** – This alternative was tested in the micro model, but was only analyzed in one of the action alternatives, as the model revealed that this alternative would have negative impacts to the navigation channel.

The following are the alternatives formulated from the above measures:

1. No Action Alternative: This alternative would result in no improvement of the degraded side channel habitat.

2. Alternative 2:
   Hard points/Notching
   Dredging below lower stone closure structure
   Pile Dike 57.9 Removal
   Dredge Material Placement into Thalwag

3. Alternative 3:
   Hard points/Notching
   Dredging below lower stone closure structure
   Pile Dike 57.9 Removal
   Dredge Material Placement into Chevron

4. Alternative 4:
   Hard points/Notching
   Dredging below wooden pile dike
   Pile Dike 57.9 Left in Place
   Dredge Material Placement into Thalwag

5. Alternative 5:
   Hard points/Notching
   Dredging below wooden pile dike

Pile Dike 57.9 Left in Place
Dredge Material Placement into Chevron

6. Alternative 6:
   Hard points/Notching
   Dredging below lower stone closure structure
   Pile Dike 57.9 Notched
   Dredge Material Placement into Thalwag

7. Alternative 7:
   Hard points/Notching
   Dredging below lower stone closure structure
   Pile Dike 57.9 Notched
   Dredge Material Placement into Chevron

8. Alternative 8:
   Hard points/Notching
   No Dredging
   Pile Dike 57.9 Left in Place

9. Alternative 9:
   Changes in the alignment and notches in Dike 62.5

2. ASSUMPTIONS.

Certain assumptions were developed regarding existing conditions and future conditions during the HEP analysis. These assumptions are listed below. For purposes of simplifying this report, all water management elevations are listed in relation to the Cape Girardeau stage data, and are simply stated as the corresponding gage elevation.

a. Existing Conditions.

(1) Currently, Schenimann Chute connects to the main channel at the upper inlet at stages at or above 8 feet, and at the lower end at stages at or above 14 feet. Flow through (a full connection of all of Schenimann Chute, including isolated chambers) occurs at stages around 16 feet.

b. Future Conditions.

(1) General. The following four general assumptions were applied to the analysis of all future changes in habitat during the 50-year project life

   a. Target years of 0, 3, 25 and 50 are sufficient to annualize HU's and to characterize habitat changes over the life of the project.

   b. The within bank aquatic area of the chute was considered one management unit.

   c. HSI's for the river otter and false map turtle were accumulated individually as an appropriate way to compute HU's for the purposes of the incremental analysis of this project.

   d. Under the no action alternative, the chute will be connected to the river during only the highest average flows during the spring, and no connection would occur during summer, fall and winter within 25 years. In 50 years, without project conditions of Schenimann

Chute will be more reflective of terrestrial forested floodplain habitat than stream habitat.

(2) Specific. Specific assumptions employed in evaluating alternative plans are given below.

a. Benefits of the Schenimann Chute restoration will provide fisheries benefits that reach beyond the chute itself.

b. Benefits of within chute area were assumed to apply to all aquatic areas within 2.5 radius of the chute entrance and exit for fish species (3000 acres).

c. Habitat benefits were only applied to the within chute aquatic area for wildlife species (273 acres).

d. It was felt that the species of the WHAG matrix would not gain or loose habitat derived from a side channel restoration, and so were not used in habitat quantification.

e. Under alternatives containing dredge cut measures, sedimentation will cause the cuts to approach current conditions shortly past the first 25 years of the project life.

f. Water quality during summer flows will improve in the chute once reconnection with the river is established.

g. Summer conditions would be most critical to the river otter, and thus was the only season considered when assessing habitat conditions for that species.

h. It was assumed that the slider turtle matrix, with modifications based on true field data would be suitable in reflecting true HSI's for false map turtles.

i. It was assumed that the fish matrices, which was compiled as an integration of the FHAG and AHAG models, with modifications based on true field data would be suitable in reflecting true HSI's for the fish used in our analysis.

j. The existing HSI values developed from the field data are a fair representation of the habitat quality of unprotected habitat in all target years and for all future conditions with or without a project.

k. Current average seasonal flows and stages would remain unchanged through the life of the project.

3. RESULTS.

Site Locations. The WHAG analysis location is shown in Figure 1.

Habitat Evaluation Matrix Appraisal Item Values. Tables 2-4 lists the particular appraisal items used in the habitat analysis of river otter, false map turtle, and fish habitats.

Habitat Evaluation. Tables 5-7 show the appraisal of current, future without, and future with project conditions for river otter, false map turtle, and fish, based on evaluation criteria.

Resultant Habitat Suitability Indices. Tables 8-10 show the resultant HSI's for each criteria, life history stages, and overall average HIS for each species evaluated.

AAHU and Net AAHU Determinations. Table 11 shows the Annulized Habitat Unit Benefits for each species evaluated, and total cumulative AAHU's for each alternative.

4. DISCUSSION. Clearly the majority of benefits derived from any alternative are from fishery habitat enhancements. Wildlife species, while also an important component of the Middle Mississippi River, do not show significant gains or losses in any of the alternatives, and are assumed to not be effected by a project. As aquatic projects such as Schenimann Chute are constructed in the future, benefits to wildlife could be assumed to increase, as increasing aquatic habitat diversity of the river would positively impact their food source for example.

Different alternatives do show significant differences in benefits to the fish species evaluated, and jumps in benefits are apparent between differing groups of alternatives. The no action alternative and alternative nine both show no benefits as neither would result in changes to the physical properties of the chute. Alternative eight shows the first significant increase in habitat benefits as a result of increased diversity in the channel's physical characteristics and connectivity to the main channel that result from placement of hardpoints and notching of closing structures. Benefits are limited due to the lack of dredging at the south end of the chute. Alternatives two, four, and six show the next jump in habitat benefits which result from differing extents of dredging at the south end of the chute. This allows a flow through system at Schenimann. The last jump in benefits can be seen under alternatives three, five, and seven. The benefits are derived from the addition of a chevron dike. The dike would act to accept material dredged from the lower end of the chute, thus creating island habitat. The chevron would also add to the complexity of the hydraulics in the area, creating deposition and scour areas. This would both increase the diversity of the bathymetry and substrate in the project area.

5. CONCLUSION. Alternatives two, three, five, six, and seven all produce a cluster of benefits that range from 2782 – 3350 AAHU's. The maximum benefits are derived from alternatives three, five and seven because each of these alternatives provides for full re-connection of the side channel, adds to the diversity to the substrate and bathymetry of the chute, and provides and additional layer of diversity by adding the chevron structure to accept material from the dredge cut at the south end of the chute. A benefit not captured by this model include the fact that the resulting island or sandbar habitat created by the chevron could be considered habitat selected for by the pallid sturgeon, an endangered species, and island type habitats are lacking in the open river. Since plan seven would cost the least of alternatives three and seven because the difference of notching rather than total removal of the lower woodpile dike, alternative seven would be considered the preferred plan.

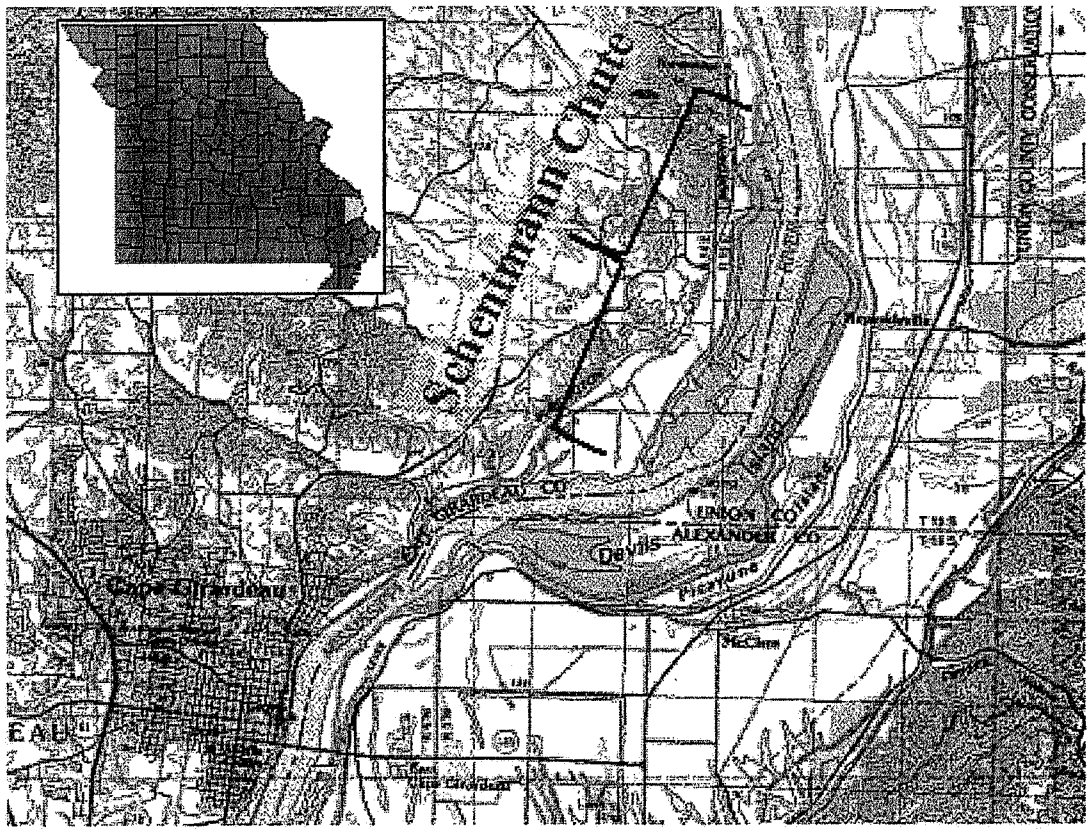

Figure 1. Vicinity map of Schenimann Chute and surrounding area.

Table 2. Listing of the appraisal items and potential ratings utilized in the HEP analysis for River Otter at Schenimann Chute.

1 Density of streamside cover	
1 Absent	0
2 sparse	0.2
3 moderate	0.5
4 dense	1
5 impenetrable	0.8
2 Shoreline topography (number of shoreline irregularities and coves	
1 relatively straight	0.2
2 moderately irregular	0.5
3 highly irregular	1
3 Availability and quality of denning sites - number of potential den sites and their distance from water	
1 not present	0
2 avail, but >100 feet away	0.5
3 avail, but <100 feet away	1
4 Water clarity	
1 Secchi <1 ft	0.1
2 Secchi 1-5	0.5
3 Secchi >5	1
5 Water depth	
1 <5 ft	1
2 5-15 ft	0.6
3 >15	0.2
6 Pool availability	
1 100% pools	1
2 90% pools	0.9
3 80% pools	0.8
4 70% pools	0.7
5 60% pools	0.6
6 50/50 pool/riffle	0.5
7 75% riffle	0.35
8 100% riffle	0.2
7 Stream size	
1 <20 ft wide	0.2
2 20-60 ft	0.5
3 >60 ft wide	1
8 Difersity/Forage Density	
1 Low	0.5
2 Medium	0.75
3 High	1

Table 3. Listing of the appraisal guide items and potential ratings utilized in the HEP analysis for the False Map Turtle at Schenimann Chute.

1 Basking Habitat	
1 Abundant	1
2 Moderate	0.7
3 Sparse	0.1
2 Water Velocity	
1 Calm	0.6
2 Moderate	1
3 Swift	0.2
3 Water Temperature (°C)	
1 >30	0.5
2 25-29	0.7
3 20-24	1
4 15-19	0.8
5 10-14	0.5
6 5-9	0.3
7 0-4	0.1
4 Water Depth (meters)	
1 >5	0.3
2 3-4	0.6
3 1-2	1
4 0-0.9	0.2
5 Water regime	
1 Contiguous	1
2 Semi-contiguous	0.5
3 Non-contiguous	0.1

Table 4. Listing of the appraisal guide items and potential HIS ranking utilized in the HEP analysis for Smallmouth Buffalo, Sauger, Shovelnose Sturgeon, Paddlefish, and Flathead Catfish at Schenimann Chute.

Habitat Variable		Smallmouth Buf.			Sauger			Shov. Sturgeon			Paddlefish			Flathead Catfish		
	value	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a
1. Average Water Temp °C																
>30	1	0	0.25	0.5	0	0	0	0	0	0.25	0	0.25	0.5	0	0.25	0.75
25-30	2	0.5	1	1	0	0.25	0.25	0.5	0.5	1	0.25	0.25	1	0.5	0.75	1
20-25	3	1	1	1	0	0.5	1	0.75	1	1	0.75	0.75	1	1	1	1
15-20	4	1	0.5	1	0.25	1	1	1	0.75	1	1	1	1	0.5	0.75	1
10-15	5	0.5	0.25	0.75	0.75	0.75	0.75	0.5	0.5	1	0.75	0.5	0.75	0.25	0.5	0.75
4-10	6	0	0.25	0.5	1	0.25	0.5	0	0	0.5	0.25	0	0.5	0	0.25	0.5
0-4	7	0	0	0.25	0	0	0.25	0	0	0.25	0	0	0.25	0	0	0.25
2. Average Turbidity (NTU)																
0-10	1	0.75	0.75	1	0.25	0.5	0.5	0.5	0.25	0.75	0.5	0.25	0.5	0.5	1	1
10-50	2	1	1	1	0.75	1	1	1	0.75	0.75	1	0.75	0.5	1	1	1
50-100	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
100-150	4	0.75	0.5	1	0.75	0.5	0.75	0.5	0.75	1	0.5	0.5	0.75	0.75	1	1
150-200	5	0.5	0.25	0.75	0.25	0.25	0.25	0.25	0.5	0.75	0.25	0.25	0.5	0.5	0.75	0.75
>200	6	0	0.25	0.5	0	0	0.25	0.25	0.25	0.5	0.25	0.25	0.5	0.25	0.5	0.5
3. Minimum Daily Dissolved O2 (mg/l)																
0-1	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-3	2	0.25	0.25	0.25	0.25	0.25	0.25	0	0.25	0.25	0	0.25	0.25	0	0.25	0.25
3-5	3	0.5	0.75	0.75	0.5	0.75	0.75	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.75
>5	4	1	1	1	1	1	1	1	1	1	1	1	1	1	1	0
4. Dominant substrate type																
Plant/Detritus	1	1	1	1	1	1	0.75	0	0.25	0.25	0	0.25	0.25	0	0.5	0.75
Clay/Silt	2	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
Sand	3	0.25	1	1	0.25	0.5	0.75	0.5	0.75	1	0.5	0.75	1	0.25	0.75	1
Gravel	4	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Rocks	5	0	0.75	1	1	1	1	1	1	1	1	1	1	1	1	1
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																
0-5	1	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
5-10	2	0.76	0.75	1	1	1	1	1	1	0.75	1	1	1	0.25	0.25	0.75
10-25	3	1	1	0.75	0.08	1	1	0.5	0.75	0.25	0.5	0.5	0.5	0.5	0.5	1
25-50	4	1	0.5	0.5	0.5	0.5	0.75	0.25	0.5	0.25	0	0.25	0.25	0.75	0.75	1
>50	5	0.75	0.5	0.25	0.25	0.25	0.25	0	0.25	0	0	0.25	0.25	1	1	1
6. Distance to Gravel Bar with Flowing Water, Miles																
<1	1							1	1	1	1	1	1		1	1
1-2	2							1	0.75	1	1	0.75	1		0.75	1
2-5	3							0.75	0.5	0.75	0.75	0.75	1		0.5	1
>5	4							0.5	0.25	0.5	0.5	0.75	1		0.25	1
7. Average Water Velocity, cm/sec																
0	1	1	1	1	0.25	1	0.75	0	0	0	0	0	1	1	0	0.5
.1-1	2	1	1	1	1	1	1	0	0	0	0	0.25	1	1	0.25	1
1-4	3	0.75	0.75	1	1	1	1	0	0	0	0	0.5	1	1	0.25	1
4-10	4	0.5	0.5	0.75	1	0.25	1	0.25	0.25	0.25	0	0.75	1	1	0.25	1
10-25	5	0.5	0.5	0.75	0.5	0	0.75	0.25	0.75	0.5	0.25	1	1	1	0.5	1
25-50	6	0.25	0.5	0.75	0.25	0	0.5	0.75	1	1	0.75	1	1	0.75	1	1
50-75	7	0	0.25	0.5	0	0	0.25	1	1	1	1	0.75	1	0.25	1	0.75
>75	8	0	0.25	0.5	0	0	0.25	1	0.5	1	1	0.25	0.75	0	0.5	0.5
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																
<0.5	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1
0.5-0.75	2	1	1	1	1	0.75	1		1	1	1	1	1	1	1	1
0.75-1	3	0.75	0.75	1	0.75	0.5	0.75		1	1	1	0.75	1	1	0.75	1
1-2	4	0.5	0.5	1	0.5	0.25	0.5		0.75	0.75	0.75	0.5	1	1	0.5	1
2-5	5	0.5	0.25	0.75	0.25	0.25	0.5		0.25	0.5	0.75	0.25	0.75	1	0.5	1
>5	6	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																
0	1			0.25			0			0			0			0
1-25	2			0.25			0.25			0.25			0.25			0.25
25-50	3			0.5			0.5			0.5			0.5			0.5
50-75	4			0.75			0.75			0.75			0.75			0.75
75-100	5			1			1			1			1			1

Table 4 Continued.

10. Connectivity of Side Channel to Main Channel																	
Year long	1		*1*	*1*		*1*	*1*			*1*	*1*		*1*	*1*		*1*	*1*
9-11 months	2		*0.8*	*0.8*		*0.5*	*0.5*			*0.8*	*0.8*		*0.8*	*0.8*		*0.8*	*0.8*
4-8 months	3		*0.6*	*0.6*		*0.1*	*0.1*			*0.6*	*0.6*		*0.4*	*0.6*		*0.6*	*0.6*
1-3 months	4		*0.4*	*0.4*		*0.1*	*0.1*			*0.2*	*0.4*		*0.2*	*0.2*		*0.4*	*0.4*
<1 month	5		*0.1*	*0.1*		*0.1*	*0.1*			*0.1*	*0.1*		*0.1*	*0.1*		*0.1*	*0.1*
11. Flow Continuity																	
Permanent	1		*1*	*1*		*1*	*1*			*1*	*1*		*1*	*1*		*1*	*1*
8-11 months	2		*0.8*	*0.8*		*0.5*	*0.5*			*0.8*	*0.8*		*0.8*	*0.8*		*0.8*	*0.8*
4-7 months	3		*0.6*	*0.6*		*0.1*	*0.1*			*0.6*	*0.6*		*0.6*	*0.6*		*0.6*	*0.6*
1-3 months	4		*0.4*	*0.4*		*0.1*	*0.1*			*0.4*	*0.4*		*0.4*	*0.4*		*0.4*	*0.4*
<1 month	5		*0.1*	*0.1*		*0.1*	*0.1*			*0.1*	*0.1*		*0.1*	*0.1*		*0.1*	*0.1*
12. % Shoreliine Rip Rapped																	
0	1	*1*	*0.5*	*0.5*	*0.25*	*0.25*	*0.25*				*0.5*					*0.25*	*0.25*
1-10	2	*1*	*0.75*	*0.75*	*0.25*	*0.5*	*0.5*				*0.75*					*0.5*	*0.5*
10-25	3	*0.5*	*1*	*1*	*0.5*	*0.75*	*0.75*				*1*					*1*	*0.75*
25-50	4	*0.5*	*1*	*1*	*0.75*	*1*	*0.75*				*1*					*1*	*0.8*
>50	5	*0.25*	*1*	*1*	*1*	*1*	*1*				*1*					*1*	*0.5*
13. Depth Diversity																	
low	1	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*	*0.2*
medium	2	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
high	3	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*

Table 5. Habitat appraisal team evaluation for River Otter habitat at Schenimann Chute.

Otter

		Alt. 1 w/o Proj	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
1 Density of streamside cover										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
2 Shoreline topography (number of shoreline irregularities and coves										
present	0	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	3	3	3	3	3	3	3	1
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
3 Availability and quality of denning sites - number of potential den sites and their distance from water										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
4 Water clarity										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
5 Water depth										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
6 Pool availability										
present	0	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
7 Stream size										
present	0	3	3	3	3	3	3	3	3	3
future w/ project (3 yr)	3	3	3	3	3	3	3	3	3	3
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
8 Diversity of food availability										
present	0	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	2	2	2	2	2	2	2	1
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0

Table 6. Habitat appraisal team evaluation for River Otter habitat at Schenimann Chute.

FALSE MAP TURTLE

		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
1 Basking Habitat										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	2	2	2	2	2	2	2	2	2
future w/ project (50yr)	50	1	1	1	1	1	1	1	1	1
2 Water Velocity										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	1	2	2	2	2	2	2	2	1
future w/ project (50yr)	50	1	2	2	2	2	2	2	2	1
3 Water Temperature (ºC)										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	1	2	2	2	2	2	2	2	2
future w/ project (50yr)	50	1	1	1	1	1	1	1	1	1
4 Water Depth										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	2	2	2	2	2	2
future w/ project (25yr)	25	2	2	2	2	2	2	2	2	2
future w/ project (50yr)	50	2	2	2	2	2	2	2	2	2
5 Water Regime										
present	0	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	1	1	1	1	1	1	1	2
future w/ project (25yr)	25	2	1	1	1	1	1	1	1	2
future w/ project (50yr)	50	3	2	2	2	2	2	2	2	3

Table 7. Habitat appraisal team evaluation for Fishery habitat at Schenimann Chute.

Fish

		Alt. 1			Alt. 2			Alt. 3			Alt. 4			Alt. 5			Alt. 6			Alt. 7			Alt. 8			Alt. 9		
		s	r	j	s	r	j	s	r	j	s	r	j	s	r	j	s	r	j	s	r	j	s	r	j	s	r	j
1. Average Water Temp oC																												
present	0	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4
future w/ project (3 yr)	3	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4
future w/ project (25yr)	25	5			5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5		
future w/ project (50yr)	50				5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4			
2. Average Turbidity (NTU)																												
present	0	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4
future w/ project (3 yr)	3	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4
future w/ project (25yr)	25	6			6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6		
future w/ project (50yr)	50				6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4	6	3	4			
3. Minimum Daily Dissolved O2 (mg/l)																												
present	0	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2
future w/ project (3 yr)	3	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2
future w/ project (25yr)	25	4			4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4		
future w/ project (50yr)	50				4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2	4	2	2			
4. Dominant substrate type																												
present	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2	2	2
future w/ project (25yr)	25	2			4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	2		
future w/ project (50yr)	50				2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2			
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																												
present	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	1			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1		
future w/ project (50yr)	50				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
6. Distance to gravel bar																												
present	0	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
future w/ project (3 yr)	3	3	3	3	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3	3	3
future w/ project (25yr)	25	3			1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	3		
future w/ project (50yr)	50				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			
7. Average Water Velocity, cm/sec																												
present	0	4	1	3	4	1	3	4	1	3	4	1	3	4	1	3	4	1	3	4	1	3	4	1	3	4	1	3
future w/ project (3 yr)	3	4	1	3	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	4	1	3
future w/ project (25yr)	25	3			5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	5	2	4	4		
future w/ project (50yr)	50				4	2	4	4	2	4	4	2	4	4	2	4	4	2	4	4	2	4	4	2	4	3		
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																												
present	0	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6
future w/ project (3 yr)	3	6	6	6	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	6	6	6	6	6	6
future w/ project (25yr)	25	6			1	1	1	1	1	1	6	6	6	6	6	6	1	1	1	1	1	1	6	6	6	6		
future w/ project (50yr)	50				6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6	6			
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																												
present	0			2			2			2			2			2			2			2			2			2
future w/ project (3 yr)	3			2			4			4			4			4			4			4			2			2
future w/ project (25yr)	25						4			4			3			3			4			4			1			
future w/ project (50yr)	50						1			1			1			1			1			1			1			
10. Connectivity of Side Channel to Main Channel																												
present	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
future w/ project (3 yr)	3	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4
future w/ project (25yr)	25	4			2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	4	4	4	4		
future w/ project (50yr)	50				4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			
11. Flow Continuity																												
present	0	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
future w/ project (3 yr)	3	4	4	4	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	4	4	4	4	4	4
future w/ project (25yr)	25	4			2	2	2	2	2	2	3	3	3	3	3	3	2	2	2	2	2	2	4	4	4	4		
future w/ project (50yr)	50				4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4			
12. % Shoreliine Rip Rapped																												
present	0	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
future w/ project (3 yr)	3	2	2	2	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2
future w/ project (25yr)	25	2			3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2		
future w/ project (50yr)	50				3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3			
13. Depth Diversity																												
present	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	1	1	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	2	2	2	1	1	1
future w/ project (25yr)	25	1			2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	1		
future w/ project (50yr)	50				1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1			

Table 8. Resultant HIS's for each appraisal item for River Otter habitat at Schenimann Chute.

Otter

		Alt. 1 w/o Proj	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
1 Density of streamside cover										
present	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
2 Shoreline topography (number of shoreline irregularities and coves										
present	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	0.2	1	1	1	1	1	1	1	0.2
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
3 Availability and quality of denning sites - number of potential den sites and their distance from water										
present	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
future w/ project (3 yr)	3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
4 Water clarity										
present	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
future w/ project (3 yr)	3	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
5 Water depth										
present	0	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (3 yr)	3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
6 Pool availability										
present	0	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
7 Stream size										
present	0	1	1	1	1	1	1	1	1	1
future w/ project (3 yr)	3	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0
8 Diversity of food availability										
present	0	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
future w/ project (3 yr)	3	0.5	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.5
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0

Table 9. Habitat appraisal team resultant HSI's for each appraisal item for false map turtle habitat at Schenimann Chute.

FALSE MAP TURTLE

		Alt. 1	Alt. 2	Alt. 3	Alt. 4	Alt. 5	Alt. 6	Alt. 7	Alt. 8	Alt. 9
1 Basking Habitat										
present	0	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*
future w/ project (3 yr)	3	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*
future w/ project (25yr)	25	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*	*0.7*
future w/ project (50yr)	50	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
2 Water Velocity										
present	0	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
future w/ project (3 yr)	3	*0.6*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
future w/ project (25yr)	25	*0.6*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*1*
future w/ project (50yr)	50	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
3 Water Temperature (ºC)										
present	0	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*
future w/ project (3 yr)	3	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*
future w/ project (25yr)	25	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*
future w/ project (50yr)	50	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*	*0.8*
4 Water Depth										
present	0	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
future w/ project (3 yr)	3	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
future w/ project (25yr)	25	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
future w/ project (50yr)	50	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*	*0.6*
5 Water Regime										
present	0	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*
future w/ project (3 yr)	3	*0.5*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0.5*
future w/ project (25yr)	25	*0.5*	*1*	*1*	*1*	*1*	*1*	*1*	*1*	*0.5*
future w/ project (50yr)	50	*0.1*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.5*	*0.1*

Table 10 ...at appraisal team resultant HIS's for each appraisal item for each fish ... ...es evaluated for Schenimann Chute.

Alternative 1 - Without Project

	T	Sml. Buf. HSI s	Sml. Buf. HSI r	Sml. Buf. HSI j/a	Sauger HSI s	Sauger HSI r	Sauger HSI j/a	Shv. Stg. HSI s	Shv. Stg. HSI r	Shv. Stg. HSI j/a	Paddlefish HSI s	Paddlefish HSI r	Paddlefish HSI j/a	Fl... HSI s	Fl... HSI r	Fl... HSI j/a
1. Average Water Temp °C																
present	0	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	3	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (25yr)	25	0.5	0	0	0.75	0	0	0.5	0	0	0.75	0	0	0.25	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Average Turbidity (NTU)																
present	0	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	3	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (25yr)	25	0	0	0	0	0	0	0.25	0.25	0	0.25	0	0	0.25	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Minimum Daily Dissolved O2 (mg/l)																
present	0	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	3	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (25yr)	25	1	0	0	1	0	0	1	0	0	1	0	0	1	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Dominant substrate type																
present	0	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (3 yr)	3	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (25yr)	25	0.25	0	0	0.5	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																
present	0	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	3	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (25yr)	25	0.25	0	0	1	0	0	1	0	0	1	0	0	0.25	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6. Distance to Gravel Bar with Flowing Water, Miles																
present	0							0.75	0.5	0.75	0.75	0.75	1		0.5	1
future w/ project (3 yr)	3							0.75	0.5	0.75	0.75	0.75	1		0.5	1
future w/ project (25yr)	25							0.75	0	0	0.75	0	0		0	0
future w/ project (50yr)	50			.				0	0	0	0	0	0		0	0
7. Average Water Velocity, cm/sec																
present	0	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	3	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (25yr)	25	0.75	0	0	1	0	0	0	0	0	0	0	0	1	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																
present	0	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	3	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (25yr)	25	0.25	0	0	0	0	0		0	0	0.5	0	0	0.75	0	0
future w/ project (50yr)	50	0	0	0	0	0	0		0	0	0	0	0	0	0	0
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																
present	0			0.25			0.25			0.25			0.25			0.25
future w/ project (3 yr)	3			0.25			0.25			0.25			0.25			0.25
future w/ project (25yr)	25			0			0			0			0			0
future w/ project (50yr)	50			0			0			0			0			0
10. Connectivity of Side Channel to Main Channel																
present	0		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)	3		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (25yr)	25		0	0		0	0		0	0		0	0		0	0
future w/ project (50yr)	50		0	0		0	0		0	0		0	0		0	0
11. Flow Continuity																
present	0		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)	3		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (25yr)	25		0	0		0	0		0	0		0	0		0	0
future w/ project (50yr)	50		0	0		0	0		0	0		0	0		0	0
12. % Shoreline Rip Rapped																
present	0	1	0.75	0.75	0.25	0.5	0.5			0.75			0.5	0.5		0.5
future w/ project (3 yr)	3	1	0.75	0.75	0.25	0.5	0.5			0.75			0.5	0.5		0.5
future w/ project (25yr)	25	1	0	0	0.25	0	0			0			0	0		0
future w/ project (50yr)	50	0	0	0	0	0	0			0			0	0		0
13. Depth Diversity																
present	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (25yr)	25	0.2	0	0	0.2	0	0	0.2	0	0	0.2	0	0	0.2	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overall Average HSI																
present	0		0.55			0.48			0.48			0.47			0.47	
future w/ project (3 yr)	3		0.55	.		0.48			0.45			0.47			0.47	
future w/ project (25yr)	25		0.16			0.17			0.16			0.15			0.14	
future w/ project (50yr)	50		0.00			0.00			0.00			0.00			0.00	

Alternative 2

	Sml. Buf. HSI s	Sml. Buf. HSI r	Sml. Buf. HSI j/a	Sauger HSI s	Sauger HSI r	Sauger HSI j/a	Shv. Stg. HSI s	Shv. Stg. HSI r	Shv. Stg. HSI j/a	Paddlefish HSI s	Paddlefish HSI r	Paddlefish HSI j/a	I... HSI s	I... HSI r	I... HSI j/a
1. Average Water Temp °C															
present	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (25yr)	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (50yr)	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
2. Average Turbidity (NTU)															
present	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (25yr)	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (50yr)	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
3. Minimum Daily Dissolved O2 (mg/l)															
present	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (25yr)	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (50yr)	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
4. Dominant substrate type															
present	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (3 yr)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (50yr)	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush															
present	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (25yr)	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (50yr)	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
6. Distance to Gravel Bar with Flowing Water, Miles															
present							0.75	0.5	0.75	0.75	0.75	1		0.5	1
future w/ project (3 yr)							1	1	1	1	1	1		1	1
future w/ project (25yr)							1	1	1	1	1	1		1	1
future w/ project (50yr)							1	1	1	1	1	1		1	1
7. Average Water Velocity, cm/sec															
present	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (25yr)	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (50yr)	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles															
present	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (25yr)	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (50yr)	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb															
present			0.25			0.25			0.25			0.25			0.25
future w/ project (3 yr)			0.75			0.75			0.75			0.75			0.75
future w/ project (25yr)			0.75			0.75			0.75			0.75			0.75
future w/ project (50yr)			0.25			0			0			0			0
10. Connectivity of Side Channel to Main Channel															
present		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (50yr)		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
11. Flow Continuity															
present		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (50yr)		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
12. % Shoreline Rip Rapped															
present	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5
future w/ project (3 yr)	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (25yr)	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (50yr)	0.5	1	1	0.5	0.75	0.75			1					1	0.75
13. Depth Diversity															
present	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (50yr)	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Overall Average HSI															
present		0.55			0.48			0.48			0.47			0.47	
future w/ project (3 yr)		0.75			0.76			0.76			0.76			0.74	
future w/ project (25yr)		0.71			0.73			0.72			0.73			0.70	
future w/ project (50yr)		0.54			0.50			0.49			0.49			0.51	

Table 10 (continued)

	Alternative 3																Alternative 4													
	Sml. Buf.				Sauger			Shv. Stg.			Paddlefish			F.			Sml. Buf.			Sauger			Shv. Stg.			Paddlefish					
	T	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a
1. Average Water Temp °C																														
present	0	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	3	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (25yr)	25	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (50yr)	50	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
2. Average Turbidity (NTU)																														
present	0	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	3	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (25yr)	25	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (50yr)	50	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
3. Minimum Daily Dissolved O2 (mg/l)																														
present	0	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	3	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (25yr)	25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (50yr)	50	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
4. Dominant substrate type																														
present	0	0.38	0.75	1.13	0.75	0.38	0.38	0	0.38	0.75	0	0.38	0.75	0	0.75	0.75	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (3 yr)	3	0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (50yr)	50	0.38	0.75	1.13	0.75	0.38	0.38	0	0.38	0.75	0	0.38	0.75	0	0.75	0.75	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																														
present	0	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	3	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (25yr)	25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (50yr)	50	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
6. Distance to Gravel Bar with Flowing Water, Miles																														
present	0							1.13	0.75	1.13	1.13	1.13	1.5		0.75	1.5				0.75	0.5	0.75	0.75	0.75	1		0.5	1			
future w/ project (3 yr)	3							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5				1	1	1	1	1	1		1	1			
future w/ project (25yr)	25							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5				1	1	1	1	1	1		1	1			
future w/ project (50yr)	50							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5				1	1	1	1	1	1		1	1			
7. Average Water Velocity, cm/sec																														
present	0	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	3	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (25yr)	25	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (50yr)	50	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																														
present	0	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	3	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (25yr)	25	1	1	1	1	1	1		1	1	1	1	1	1	1	1	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (50yr)	50	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																														
present	0			0.38			0.38			0.38			0.38			0.38			0.25			0.25			0.25			0.25		
future w/ project (3 yr)	3			1.13			1.13			1.13			1.13			1.13			0.75			0.75			0.75			0.75		
future w/ project (25yr)	25			1.13			1.13			1.13			1.13			1.13			0.5			0.5			0.5			0.5		
future w/ project (50yr)	50			0.38			0			0			0			0			0.25			0			0			0		
10. Connectivity of Side Channel to Main Channel																														
present	0		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)	3		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)	25		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8		0.6	0.6		0.1	0.1		0.6	0.6		0.4	0.6		0.6	0.6
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
11. Flow Continuity																														
present	0		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)	3		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)	25		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8		0.6	0.6		0.1	0.1		0.6	0.6		0.6	0.6		0.6	0.6
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
12. % Shoreline Rip Rapped																														
present	0	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5
future w/ project (3 yr)	3	0.5	1	1	0.5	0.75	0.75			1					1	0.75	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (25yr)	25	0.5	1	1	0.5	0.75	0.75			1					1	0.75	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (50yr)	50	0.5	1	1	0.5	0.75	0.75			1					1	0.75	0.5	1	1	0.5	0.75	0.75			1					1	0.75
13. Depth Diversity																														
present	0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (50yr)	50	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Overall Average HSI																														
present	0		0.59			0.51			0.53			0.53			0.52			0.55			0.48			0.48			0.47			0.47	
future w/ project (3 yr)	3		0.83			0.87			0.91			0.90			0.86			0.75			0.76			0.76			0.76			0.74	
future w/ project (25yr)	25		0.78			0.81			0.86			0.85			0.81			0.62			0.59			0.65			0.64			0.64	
future w/ project (50yr)	50		0.58			0.52			0.56			0.55			0.56			0.54			0.50			0.49			0.49			0.51	

Table 10 ...nued

	T	Alternative 5															Alternative 6												
		Sml. Buf.			Sauger			Shv. Stg.			Paddlefish			Fl...			Sml. Buf.			Sauger			Shv. Stg.			Paddlefish			F...		
		HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a
1. Average Water Temp °C																															
present	0	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	3	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (25yr)	25	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (50yr)	50	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
2. Average Turbidity (NTU)																															
present	0	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	3	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (25yr)	25	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (50yr)	50	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
3. Minimum Daily Dissolved O2 (mg/l)																															
present	0	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	3	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (25yr)	25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (50yr)	50	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
4. Dominant substrate type																															
present	0	0.38	0.75	1.13	0.75	0.38	0.38	0	0.38	0.75	0	0.38	0.75	0	0.75	0.75	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (3 yr)	3	0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (50yr)	50	0.38	0.75	1.13	0.75	0.38	0.38	0	0.38	0.75	0	0.38	0.75	0	0.75	0.75	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																															
present	0	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	3	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (25yr)	25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (50yr)	50	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
6. Distance to Gravel Bar with Flowing Water, Miles																															
present	0							1.13	0.75	1.13	1.13	1.13	1.5		0.75	1.5				0.75	0.5	0.75	0.75	0.75	1		0.5	1			
future w/ project (3 yr)	3							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5				1	1	1	1	1	1		1	1			
future w/ project (25yr)	25							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5				1	1	1	1	1	1		1	1			
future w/ project (50yr)	50							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5				1	1	1	1	1	1		1	1			
7. Average Water Velocity, cm/sec																															
present	0	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	3	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (25yr)	25	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (50yr)	50	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																															
present	0	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	3	1	1	1	1	1	1		1	1	1	1	1	1	1	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (50yr)	50	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																															
present	0			0.38			0.38			0.38			0.38			0.38			0.25			0.25			0.25			0.25			0.25
future w/ project (3 yr)	3			1.13			1.13			1.13			1.13			1.13			0.75			0.75			0.75			0.75			0.75
future w/ project (25yr)	25			0.75			0.75			0.75			0.75			0.75			0.75			0.75			0.75			0.75			0.75
future w/ project (50yr)	50			0.38			0			0			0			0			0.25			0			0			0			0
10. Connectivity of Side Channel to Main Channel																															
present	0		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)	3		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)	25		0.6	0.6		0.1	0.1		0.6	0.6		0.4	0.6		0.6	0.6		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
11. Flow Continuity																															
present	0		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)	3		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)	25		0.6	0.6		0.1	0.1		0.6	0.6		0.6	0.6		0.6	0.6		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
12. % Shoreline Rip Rapped																															
present	0	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5
future w/ project (3 yr)	3	0.5	1	1	0.5	0.75	0.75			1					1	0.75	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (25yr)	25	0.5	1	1	0.5	0.75	0.75			1					1	0.75	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (50yr)	50	0.5	1	1	0.5	0.75	0.75			1					1	0.75	0.5	1	1	0.5	0.75	0.75			1					1	0.75
13. Depth Diversity																															
present	0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (50yr)	50	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Overall Average HSI																															
present	0		0.59			0.51			0.53			0.53			0.52			0.55			0.48			0.48			0.47			0.47	
future w/ project (3 yr)	3		0.83			0.87			0.91			0.90			0.86			0.75			0.76			0.76			0.76			0.74	
future w/ project (25yr)	25		0.69			0.67			0.78			0.76			0.75			0.71			0.73			0.72			0.73			0.70	
future w/ project (50yr)	50		0.58			0.52			0.56			0.55			0.56			0.54			0.50			0.49			0.49			0.51	

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Table 10 [illegible]nued

Alternative 7

	T	Sml. Buf.			Sauger			Shv. Stg.			Paddlefish			F[illegible]		
		HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a
1. Average Water Temp °C																
present	0	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	3	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (25yr)	25	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (50yr)	50	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
2. Average Turbidity (NTU)																
present	0	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	3	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (25yr)	25	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (50yr)	50	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
3. Minimum Daily Dissolved O2 (mg/l)																
present	0	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	3	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (25yr)	25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (50yr)	50	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
4. Dominant substrate type																
present	0	0.38	0.75	1.13	0.75	0.38	0.38	0	0.38	0.75	0	0.38	0.75	0	0.75	0.75
future w/ project (3 yr)	3	0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
future w/ project (25yr)	25	0	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
future w/ project (50yr)	50	0.38	0.75	1.13	0.75	0.38	0.38	0	0.38	0.75	0	0.38	0.75	0	0.75	0.75
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																
present	0	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	3	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (25yr)	25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (50yr)	50	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
6. Distance to Gravel Bar with Flowing Water, Miles																
present	0							1.13	0.75	1.13	1.13	1.13	1.5		0.75	1.5
future w/ project (3 yr)	3							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
future w/ project (25yr)	25							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
future w/ project (50yr)	50							1.5	1.5	1.5	1.5	1.5	1.5		1.5	1.5
7. Average Water Velocity, cm/sec																
present	0	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	3	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (25yr)	25	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (50yr)	50	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																
present	0	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	3	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (25yr)	25	1	1	1	1	1	1		1	1	1	1	1	1	1	1
future w/ project (50yr)	50	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																
present	0			0.38			0.38			0.38			0.38			0.38
future w/ project (3 yr)	3			1.13			1.13			1.13			1.13			1.13
future w/ project (25yr)	25			1.13			1.13			1.13			1.13			1.13
future w/ project (50yr)	50			0.38			0			0			0			0
10. Connectivity of Side Channel to Main Channel																
present	0		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)	3		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)	25		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
11. Flow Continuity																
present	0		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)	3		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (25yr)	25		0.8	0.8		0.5	0.5		0.8	0.8		0.8	0.8		0.8	0.8
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
12. % Shoreline Rip Rapped																
present	0	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5
future w/ project (3 yr)	3	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (25yr)	25	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (50yr)	50	0.5	1	1	0.5	0.75	0.75			1					1	0.75
13. Depth Diversity																
present	0	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
future w/ project (3 yr)	3	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5
future w/ project (25yr)	25	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9	0.9
future w/ project (50yr)	50	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Overall Average HSI																
present	0		0.59			0.51			0.53			0.53			0.52	
future w/ project (3 yr)	3		0.83			0.87			0.91			0.90			0.86	
future w/ project (25yr)	25		0.78			0.81			0.86			0.85			0.81	
future w/ project (50yr)	50		0.58			0.52			0.56			0.55			0.56	

Alternative 8

	T	Sml. Buf.			Sauger			Shv. Stg.			Paddlefish			F[illegible]		
		HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a	HSI s	HSI r	HSI j/a
1. Average Water Temp °C																
present	0	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	3	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (25yr)	25	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (50yr)	50	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
2. Average Turbidity (NTU)																
present	0	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	3	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (25yr)	25	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
future w/ project (50yr)	50	0	1	1	0	1	0.75	0.25	0.25	1	0.25	1	0.75	0.25	1	1
3. Minimum Daily Dissolved O2 (mg/l)																
present	0	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	3	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (25yr)	25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (50yr)	50	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
4. Dominant substrate type																
present	0	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (3 yr)	3	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (25yr)	25	0	1	1	1	1	1	1	1	1	1	1	1	1	1	1
future w/ project (50yr)	50	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																
present	0	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	3	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (25yr)	25	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (50yr)	50	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
6. Distance to Gravel Bar with Flowing Water, Miles																
present	0							0.75	0.5	0.75	0.75	0.75	1		0.5	1
future w/ project (3 yr)	3							1	1	1	1	1	1		1	1
future w/ project (25yr)	25							1	1	1	1	1	1		1	1
future w/ project (50yr)	50							1	1	1	1	1	1		1	1
7. Average Water Velocity, cm/sec																
present	0	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	3	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (25yr)	25	0.5	1	0.75	0.5	1	1	0.25	0	0.25	0.25	0.25	1	1	0.25	1
future w/ project (50yr)	50	0.5	1	0.75	1	1	1	0.25	0	0.25	0	0.25	1	1	0.25	1
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																
present	0	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	3	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (25yr)	25	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (50yr)	50	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																
present	0			0.25			0.25			0.25			0.25			0.25
future w/ project (3 yr)	3			0.25			0.25			0.25			0.25			0.25
future w/ project (25yr)	25			0.25			0			0			0			0
future w/ project (50yr)	50			0.25			0			0			0			0
10. Connectivity of Side Channel to Main Channel																
present	0		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)	3		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (25yr)	25		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
11. Flow Continuity																
present	0		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)	3		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (25yr)	25		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (50yr)	50		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
12. % Shoreline Rip Rapped																
present	0	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5
future w/ project (3 yr)	3	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (25yr)	25	0.5	1	1	0.5	0.75	0.75			1					1	0.75
future w/ project (50yr)	50	0.5	1	1	0.5	0.75	0.75			1					1	0.75
13. Depth Diversity																
present	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (25yr)	25	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
future w/ project (50yr)	50	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Overall Average HSI																
present	0		0.55			0.48			0.48			0.47			0.47	
future w/ project (3 yr)	3		0.59			0.58			0.61			0.60			0.62	
future w/ project (25yr)	25		0.59			0.58			0.61			0.60			0.61	
future w/ project (50yr)	50		0.54			0.50			0.49			0.49			0.51	

Table 10. Continued

Alternative 9

	T	Sml. Buf. HSI s	Sml. Buf. HSI r	Sml. Buf. HSI j/a	Sauger HSI s	Sauger HSI r	Sauger HSI j/a	Shv. Stg. HSI s	Shv. Stg. HSI r	Shv. Stg. HSI j/a	Paddlefish HSI s	Paddlefish HSI r	Paddlefish HSI j/a	Flt. Cat. HSI s	Flt. Cat. HSI r	Flt. Cat. HSI j/a
1. Average Water Temp °C																
present	0	0.5	1	1	0.75	0.25	1	0.5	0.5	1	0.75	0.25	1	0.25	0.75	1
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2. Average Turbidity (NTU)																
present	0	0	1	1	0	1	0.75	0.25	1	1	0.25	1	0.75	0.25	1	1
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3. Minimum Daily Dissolved O2 (mg/l)																
present	0	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25	1	0.25	0.25
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4. Dominant substrate type																
present	0	0.25	0.5	0.75	0.5	0.25	0.25	0	0.25	0.5	0	0.25	0.5	0	0.5	0.5
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
5. Percent Surface Area w/ Visible logs, Indundated Timber and/or Brush																
present	0	0.25	0.5	1	1	1	1	1	1	1	1	1	1	0.25	0.25	0.25
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
6. Distance to Gravel Bar with Flowing Water, Miles																
present	0							0.75	0.5	0.75	0.75	0.75	1		0.5	1 *
future w/ project (3 yr)	3							0	0	0	0	0	0		0	0
future w/ project (25yr)	25							0	0	0	0	0	0		0	0
future w/ project (50yr)	50							0	0	0	0	0	0		0	0
7. Average Water Velocity, cm/sec																
present	0	0.5	1	1	1	1	1	0.25	0	0	0	0	1	1	0	1
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
8. Distance to Nearest Side Channel with Perm. Water >2m and Year Round Connectivity, Miles																
present	0	0.25	0.25	0.75	0	0.25	0.25		0.25	0.25	0.5	0.25	0.5	0.75	0.25	1
future w/ project (3 yr)	3	0	0	0	0	0	0		0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0		0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0		0	0	0	0	0	0	0	0
9. Percent of Backwater/Sidechannel Area Suitable as Overwintering habitat from Nov-Feb																
present	0			0.25			0.25			0.25			0.25			0.25
future w/ project (3 yr)	3			0			0			0			0			0
future w/ project (25yr)	25			0			0			0			0			0
future w/ project (50yr)	50			0			0			0			0			0
10. Connectivity of Side Channel to Main Channel																
present	0		0.4	0.4		0.1	0.1		0.2	0.4		0.2	0.2		0.4	0.4
future w/ project (3 yr)	3		0	0		0	0		0	0		0	0		0	0
future w/ project (25yr)	25		0	0		0	0		0	0		0	0		0	0
future w/ project (50yr)	50		0	0		0	0		0	0		0	0		0	0
11. Flow Continuity																
present	0		0.4	0.4		0.1	0.1		0.4	0.4		0.4	0.4		0.4	0.4
future w/ project (3 yr)	3		0	0		0	0		0	0		0	0		0	0
future w/ project (25yr)	25		0	0		0	0		0	0		0	0		0	0
future w/ project (50yr)	50		0	0		0	0		0	0		0	0		0	0
12. % Shoreline Rip Rapped																
present	0	1	0.75	0.75	0.25	0.5	0.5			0.75					0.5	0.5
future w/ project (3 yr)	3	0	0	0	0	0	0			0					0	0
future w/ project (25yr)	25	0	0	0	0	0	0			0					0	0
future w/ project (50yr)	50	0	0	0	0	0	0			0					0	0
13. Depth Diversity																
present	0	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
future w/ project (3 yr)	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (25yr)	25	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
future w/ project (50yr)	50	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Overall Average HSI																
present	0		0.55			0.48			0.48			0.47			0.47	
future w/ project (3 yr)	3		0.00			0.00			0.00			0.00			0.00	
future w/ project (25yr)	25		0.00			0.00			0.00			0.00			0.00	
future w/ project (50yr)	50		0.00			0.00			0.00			0.00			0.00	

Table 11. Overall AAHU's for each guild and each of the alternatives.

	Large Lotic Guild			**Large Lentic Guild**					**Wildlife**			
	Shov. Sturgeon	Sauger	*Average Large Lotic Guild*	Sm. Buffalo	Paddlefish	Flathead Catfish	*Average Large Lentic Guild*	***Lotic and Lentic Net AAHU***	Otter AAHU's	Turtle AAHU's	***Wildlife Net AAHU's***	**Fish/ Wildlife Total AAHU's**
	Net AAHU's	Net AAHU's		Net AAHU's	Net AAHU's	Net AAHU's			Net AAHU's	Net AAHU's		
Alt 1	0	0	*0*	0	0	0	*0.0*	***0.0***	0	0	***0***	**0.0**
Alt 2	1384.1	1363.5	*1373.8*	1331.8	1396.2	1374.9	*1367.6*	***2741.4***	0	40.8408	***40.8408***	**2782.3**
Alt 3	1750.2	1586.8	*1668.5*	1522.9	1734.8	1664.1	*1640.6*	***3309.1***	0	40.8408	***40.8408***	**3349.9**
Alt 4	1284.3	1174.6	*1229.45*	1208.3	1274.8	1293.3	*1258.8*	***2488.3***	0	40.8408	***40.8408***	**2529.1**
Alt 5	1645.9	1393	*1519.45*	1394.4	1608.5	1578	*1527.0*	***3046.4***	0	40.8408	***40.8408***	**3087.3**
Alt 6	1384.1	1363.5	*1373.8*	1331.8	1396.2	1374.9	*1367.6*	***2741.4***	0	40.8408	***40.8408***	**2782.3**
Alt 7	1750.2	1586.8	*1668.5*	1522.9	1734.8	1664.1	*1640.6*	***3309.1***	0	40.8408	***40.8408***	**3349.9**
Alt 8	1117.7	1020.8	*1069.25*	1048.8	1098.7	1153.7	*1100.4*	***2169.7***	0	40.8408	***40.8408***	**2210.5**
Alt 9	0	0	*0*	0	0	0	*0.0*	***0.0***	0	15.7248	***15.7248***	**15.7**

APPENDIX G

COST ESTIMATES

COST ESTIMATES FOR PRELIMINARY PLANS

GOVERNMENT ESTIMATE WORKSHEET

Sheet 1 of 1

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-2

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Remove Sediment Near Dike 57.9 R				
	a. First 1,822 C.Y.	1,822	CY	3.60	**6,559.20**
	b. All Over 1,822 C.Y.	900	CY	3.40	**3,060.00**
6	Remove Dike 57.9 R	1	LS	14,000.00	**14,000.00**
7	Hydraulic Dredging (RM 57.1 to 58.2)	210,000	CY	2.50	**525,000.00**
	SUBTOTAL:				**$1,922,109.20**
	Contingency - 10%				**191,210.92**
	SUBTOTAL:				**$2,113,000.00**
	Planning, Engineering & Design - 10%				**211,300.00**
	Construction Management - 10%				**211,300.00**
	TOTAL PROJECT COST				**$2,535,600.00**

GOVERNMENT ESTIMATE WORKSHEET

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-3

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Remove Sediment Near Dike 57.9 R				
	a. First 1,822 C.Y.	1,822	CY	3.60	**6,559.20**
	b. All Over 1,822 C.Y.	900	CY	3.40	**3,060.00**
6	Remove Dike 57.9 R	1	LS	14,000.00	**14,000.00**
7	Stone Chevron Graded Stone 'A' (R.M. 57.0 R)				
	a. First 12,500 Ton	12,500	Ton	9.00	**112,500.00**
	b. All Over 12,500 Ton	8,400	Ton	9.00	**75,600.00**
8	Hydraulic Dredging (RM 57.1 to 58.2)	210,000	CY	2.50	**525,000.00**
	SUBTOTAL:				**$2,110,209.20**
	Contingency - 10%				**210,020.92**
	SUBTOTAL:				**$2,320,000.00**
	Planning, Engineering & Design - 10%				**232,000.00**
	Construction Management - 10%				**232,000.00**
	TOTAL PROJECT COST				**$2,784,000.00**

GOVERNMENT ESTIMATE WORKSHEET

Sheet 1 of 1

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-4

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Hydraulic Dredging (RM 57.1 to 57.9)	145,000	CY	2.50	**362,500.00**
	SUBTOTAL:				**$1,735,990.00**
	Contingency - 10%				**172,599.00**
	SUBTOTAL:				**$1,909,000.00**
	Planning, Engineering & Design - 10%				**190,900.00**
	Construction Management - 10%				**190,900.00**
	TOTAL PROJECT COST				**$2,290,800.00**

GOVERNMENT ESTIMATE WORKSHEET

Sheet 1 of 1

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-5

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Stone Chevron Graded Stone 'A' (R.M. 57.0 R)				
	a. First 12,500 Ton	12,500	Ton	9.00	**112,500.00**
	b. All Over 12,500 Ton	8,400	Ton	9.00	**75,600.00**
6	Hydraulic Dredging (RM 57.1 to 57.9)	145,000	CY	2.50	**362,500.00**
	SUBTOTAL:				**$1,924,090.00**
	Contingency - 10%				**191,409.00**
	SUBTOTAL:				**$2,115,000.00**
	Planning, Engineering & Design - 10%				**211,500.00**
	Construction Management - 10%				**211,500.00**
	TOTAL PROJECT COST				**$2,538,000.00**

GOVERNMENT ESTIMATE WORKSHEET

Sheet 1 of 1

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-6

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Remove Sediment Near Dike 57.9 R				
	a. First 911 C.Y.	911	CY	3.60	**3,279.60**
	b. All Over 911 C.Y.	450	CY	3.40	**1,530.00**
6	Notch Pile Dike 57.9 R	1	LS	7,000.00	**7,000.00**
7	Hydraulic Dredging (RM 57.1 to 58.2)+C55	210,000	CY	2.50	**525,000.00**
	SUBTOTAL:				**$1,910,299.60**
	Contingency - 10%				**190,029.96**
	SUBTOTAL:				**$2,100,000.00**
	Planning, Engineering & Design - 10%				**210,000.00**
	Construction Management - 10%				**210,000.00**
	TOTAL PROJECT COST				**$2,520,000.00**

GOVERNMENT ESTIMATE WORKSHEET

Sheet 1 of 1

Project: ***SCHENIMANN CHUTE -DRAFT PDA***
Project Cost Estimate Alternative C-7

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Remove Sediment Near Dike 57.9 R				
	a. First 911 C.Y.	911	CY	3.60	**3,279.60**
	b. All Over 911 C.Y.	450	CY	3.40	**1,530.00**
6	Notch Pile Dike 57.9 R	1	LS	7,000.00	**7,000.00**
7	Stone Chevron Graded Stone 'A' (R.M. 57.0 R)				
	a. First 12,500 Ton	12,500	Ton	9.00	**112,500.00**
	b. All Over 12,500 Ton	8,400	Ton	9.00	**75,600.00**
8	Hydraulic Dredging (RM 57.1 to 58.2)	210,000	CY	2.50	**525,000.00**
	SUBTOTAL:				**$2,098,399.60**
	Contingency - 10%				**208,839.96**
	SUBTOTAL:				**$2,307,000.00**
	Planning, Engineering & Design - 10%				**230,700.00**
	Construction Management - 10%				**230,700.00**
	TOTAL PROJECT COST				**$2,768,400.00**

GOVERNMENT ESTIMATE WORKSHEET

Sheet 1 of 1

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-8

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
	SUBTOTAL:				**$1,373,490.00**
	Contingency - 10%				**136,349.00**
	SUBTOTAL:				**$1,510,000.00**
	Planning, Engineering & Design - 10%				**151,000.00**
	Construction Management - 10%				**151,000.00**
	TOTAL PROJECT COST				**$1,812,000.00**

GOVERNMENT ESTIMATE WORKSHEET

Project: ***SCHENIMANN CHUTE - DRAFT PDA***
Project Cost Estimate Alternative C-9

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Realign and Notch Dike 62.5 R	1	LS	$12,000.00	**12,000.00**
	SUBTOTAL:				**$22,000.00**
	Contingency - 10%				**1,200.00**
	SUBTOTAL:				**$23,000.00**
	Planning, Engineering & Design - 10%				**2,300.00**
	Construction Management - 10%				**2,300.00**
	TOTAL PROJECT COST				**$27,600.00**

Preliminary Schenimann Chute Estimate of Annual Operations, Maintenance, Costs

Item	Interval					Average Annual Price ($)
	Years	Quantity	Unit	Unit Price ($)	Total Price ($)	
Operations						
None						
Maintenance						
Hard Point Inspection and Reporting	Annual	40	Hr.	$25.00	$1,000.00	$1,000.00
Fish & Wildlife Management	Annual	Sum	Job		$2,000.00	$2,000.00
Hard Point Maintenance	1 in 5	4,000	Tons	$8.00	$32,000.00	$6,400.00
				Total Maintenance		$9,400.00

COST ESTIMATE FOR DRAFT RECOMMENDED PLAN

GOVERNMENT ESTIMATE WORKSHEET

Project: ***SCHENIMANN CHUTE -DRAFT PDA***
Project Cost Estimate Alternative C-7

DATE: 14 MAY 2002

ITEM NO.	DESCRIPTION	ESTIMATED QUANTITY	UNIT	UNIT PRICE	ESTIMATED AMOUNT
1	Lands and Damages	1	LS	$10,000.00	**10,000.00**
2	Stone Hardpoints, Graded Stone 'A'				
	a. First 43,400 Ton	43,400	Ton	8.00	**347,200.00**
	b. All Over 43,400 Ton	28,900	Ton	8.00	**231,200.00**
3	Stone Revetment, Graded Stone 'A'				
	a. First 48,800 Ton	48,800	Ton	9.50	**463,600.00**
	b. All Over 48,800 Ton	32,500	Ton	9.50	**308,750.00**
4	Notch Stone Dike and Recycle Stone (Dike 59.8 R),				
	(Dike 58.7R) and (Dike 58.2 R)				
	a. First 1,180 Ton	1,180	Ton	6.50	**7,670.00**
	b. All Over 1,180 Ton	780	Ton	6.50	**5,070.00**
5	Remove Sediment Near Dike 57.9 R				
	a. First 911 C.Y.	911	CY	3.60	**3,279.60**
	b. All Over 911 C.Y.	450	CY	3.40	**1,530.00**
6	Notch Pile Dike 57.9 R	1	LS	7,000.00	**7,000.00**
7	Stone Chevron Graded Stone 'A' (R.M. 57.0 R)				
	a. First 12,500 Ton	12,500	Ton	9.00	**112,500.00**
	b. All Over 12,500 Ton	8,400	Ton	9.00	**75,600.00**
8	Hydraulic Dredging (RM 57.1 to 58.2)	210,000	CY	2.50	**525,000.00**
	SUBTOTAL:				**$2,098,399.60**
	Contingency - 10%				**208,839.96**
	SUBTOTAL:				**$2,307,000.00**
	Planning, Engineering & Design - 10%				**230,700.00**
	Construction Management - 10%				**230,700.00**
	TOTAL PROJECT COST				**$2,768,400.00**

Schenimann Chute Estimate of Annual Operations, Maintenance, Costs

Item	Interval					Average Annual Price ($)
	Years	Quantity	Unit	Unit Price ($)	Total Price ($)	
Operations						
None						
Maintenance						
Hard Point Inspection and Reporting	Annual	40	Hr.	$25.00	$1,000.00	$1,000.00
Fish & Wildlife Management	Annual	Sum	Job		$2,000.00	$2,000.00
Hard Point Maintenance	1 in 5	4,000	Tons	$8.00	$32,000.00	$5,557.00
				Total Maintenance		$8,557.00

APPENDIX H

REAL ESTATE CONSIDERATIONS

Real Estate Plan
Schenimann Chute
Environmental Management Project

Project Description

This project is located between river miles 57 and 63 on the right descending bank of the Mississippi River, approximately 5 miles north of the city of Cape Girardeau in the county of Cape Girardeau, Missouri. It consists of the notching of existing stone dikes, construction of stub dikes and/or hardpoints, placing of revetment, and dredging of approximately 75,000 cubic yards of sand at the lower end of the chute. This design will improve aquatic habitat diversity and benefit the endangered Pallid Sturgeon by moving sediment, reducing bank erosion, creating scour holes and plunge pools, and deepening the lower portion of Schenimann Chute.

This real estate plan was developed after a through review of the construction plans, a site visit a review of ownership maps and numerous meetings of the St. Louis District Schenimann Chute team..

1. Purpose

This Real Estate Plan is in support of the draft Plan Design Analysis for public notice and partner review.

2. Lands, Easements and Right-of-Way (LER) Required for the Construction

The construction of the project will, for the most part, be completed from the navigable waters of the United States. A number of hardpoints will be installed and anchored into privately owned properties. A total of 6 ownerships will be affected by the installation of these hardpoints. St. Louis District experience, in similar side channel improvement projects under the Avoid and Minimize program, has demonstrated that construction can be completed and satisfactory results obtained through the use of rights-of-entry rather than obtaining a permanent real estate interest. Rights-of-entry will be obtained from the 6 affected property owners for this construction.

3. LER Required that is Owned by Sponsor

Due to the anticipated benefits to the endangered Pallid Sturgeon, the construction of this project will be 100% federally funded. The Missouri Department of Conservation will be responsible for all operations and maintenance of the project once it is completed.

4. Proposed Non-standard Estates

There are no non-standard estates required.

5. Existing Federal Project within the LER Required for the Project

There are no existing Federal Projects within the LER required for this project.

6. Federally Owned Land Required for the Project

There is no federally owned land in the required LER.

7. Navigation Servitude

Construction will take place within navigable waters of the United States, including the Mississippi River and Schenimann Chute.

8. Map Depicting the Area

Refer to Plate "A", attached.

9. Possibility of Induced Flooding Due to Project

There will be no induced flooding as a result of this project.

10. Baseline Cost Estimate

A cost estimate is attached as "Table 1."

11. Relocation Assistance Benefits under Public Law 91-646

There are no relocations associated with this project.

12. Mineral Activity in Project Area

No mineral activity is known to exist in the area of this project.

13. Sponsors Legal and Professional Capability to Acquire LER

Since construction of this project is 100% Federal, the St. Louis District will acquire all necessary LER.

14. Zoning Ordinances Proposed

No known zoning ordinances are proposed.

15. Schedule of Land Acquisition Milestones

Construction of this project is now scheduled for May 2003. The 6 required rights-of-entry will be in place to meet this construction schedule.

16. Facility of Utility Relocations

There are no utility relocations required for this project.

17. Impacts of Suspected or Known Contaminants

No known contaminants have been found.

18. Landowner Support or Opposition to the Project

There is no known opposition to this project. The community views this project positively and fully supports it.

19. Notification to the Non-Federal Sponsor Regarding Risks Associated with Acquiring Land Before Execution of the PCA

Since the Government will obtain all necessary realty rights for this project, this is not applicable.

20. Other Real Estate Issues Relevant to the Project

None are known to exist.

Thomas R. Hewlett
Chief, Real Estate Division
USACE, St. Louis District

APPENDIX I

CULTURAL RESOURCES

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

August 22, 2001

Environmental Analysis Branch
Planning, Programs, and Project Management Division

Ms. Claire Blackwell, Director
Deputy State Historic Preservation Officer
Historic Preservation Program
Missouri Department of Natural Resources
P. O. Box 176
Jefferson City, MO 65102

Dear Ms. Blackwell:

Pursuant to the National Historic Preservation Act, Section 106 (as amended), and its implementing regulation 36CFR800 the St. Louis District, U. S. Army Corps of Engineers (District), wishes to notify the Missouri State Historic Preservation Officer (MSHPO) that the District is preparing a combined Planning Design Analysis/ Environmental Assessment (PDA/EA) for the Schenimann Chute Side Channel Habitat Rehabilitation and Enhancement Project (HREP), Mississippi River miles 57 – 63, right descending bank, Cape Girardeau County, Missouri (Enclosure 1). This is part of the Upper Mississippi River System – Environmental Management Program (UMRS-EMP). Initial authorization and appropriations were provided on August 15, 1985 by the Supplemental Appropriations Bill (PL 99-662) for the EMP. A more comprehensive authorization was provided by Section 1103 of the Water Resources Development Act of 1986 (PL 99-662). The Missouri Department of Conservation is the non-Federal sponsor. Project construction is 100% Federal based on benefits to the pallid sturgeon, a Federally Endangered Species.

Schenimann Chute is one of only 23 remaining side channels along the 202 miles of open river between St. Louis, Missouri and Cairo, Illinois, at the mouth of the Ohio River (Enclosure 2). The Chute side channels have been degraded by the accumulation of sediment and without action, will become part of the adjacent land, thus elimination an important habitat component of the open river ecosystem. A micromodel of various habitat enhancement modifications has resulted in nine alternatives. These proposed alternatives include notching of existing stone dikes, construction of stub dikes and/or hard points, placement of revetment and dredging of approximately 75,000 cubic yards of sand at the lower end of the Chute to improve connectivity with the river. These alterations would allow scouring to occur at higher flows creating holes and a sinuous flow pattern through the side channel. The project would improve aquatic habitat diversity by moving sediment, reducing bank erosion, creating scour holes and plunge pools and deepening the downstream connection with the river.

There are no known historic properties (prehistoric or historic archaeological sites, structures) within the project area. The Archaeological Survey of Missouri does not have any sites recorded in the project area (ASM Identification Number 01-7-522) (Enclosure 3). The sites reported on their Request for Information form (enclosed) are all at least one-half mile from the project area. No steamboat wrecks have been reported from the project area (F. Terry Norris, personal communication, July 9, 2001). Native American Tribes are being contacted to determine if they attach importance to this area.

This is not surprising since most, if not all land adjacent to the Chute was recently accreted by the Mississippi River within the last 100 or less years and therefore will not contain prehistoric archaeological sites. All land on the left descending (east) bank was created by pile dikes placed from the then right descending (west) Mississippi bank into the river channel in the early 1930's. The artificial creation of the land and chute are documented in a series of historic maps and aerial photographs taken from the Micromodel (Enclosure 4). The land accretion and chute development is documented by aerial photographs taken in 1932 and 1935 during dike construction and another aerial photograph taken in 1965 after full development of the left descending (east) bank or "islands". The historic maps were combined in an unpublished map by Claude Strauser, District Potamologist, which documents that various parts of the land on the Chute's right descending (west) bank was reworked by the Mississippi around 1919, 1907 and/or 1899 (Enclosure 5). Supporting this, the soils on both sides of the Chute have been classified as Caruthersville series and Commerce series which both formed in recent alluvium along the Mississippi River (Festervand, D. F. 1981. *Soil Survey of Cape Girardeau, Mississippi, and Scott Counties, Missouri*, pp 70, 79. United States Department of Agriculture, Soil Conservation Service, in cooperation with the Missouri Agricultural Experiment Station).

The project is being planned to avoid any effect to significant historic properties. A list of project alternatives (Enclosure 6) and maps showing the project element locations (Enclosure 7) are attached. Most construction will be confined to accreted lands, previously disturbed areas or will be modification of existing dikes. All project alternatives will avoid impacts from the following project elements:

1) enlarging existing notches in dikes at river miles 58.2, 58.7, 59.8;
2) notching or removing dike river mile 57.9;
3) dredging near the mouth of the Chute to remove material deposited since chute formation in the 1930's ; dredging will not extend below the 1930's chute bottom;
4) disposing of dredge material on left descending (east) bank or island, or in the Mississippi River (thalweg or chevron alternatives);
5) constructing on accreted ground a) seven hard points on the left descending (east) bank or bank revetment or b) northern bank revetment on right descending (west) bank.

Proposed project elements which apparently are not located in accreted ground and therefore could impact historic properties are:

1) construction of eight hard points on right descending (west) bank (Alternatives 2 - 8);

2) construction of southern bank revetment on right descending (west) bank. (Alternatives 2 - 8);

3) any use of "upland area" (floodplain which may not be recently accreted land such as, constructing haul roads, staging or storing equipment (will be determined during Construction phase).

When the exact location of each of these elements has been selected, each will be surveyed to locate any historic properties. Elements on the right bank must be surveyed during low water, usually October. In the highly unlikely event any cultural properties are located, these will be evaluated for National Register eligibility, in consultation with the Missouri Historic Preservation Officer and appropriate mitigation completed before construction.

All existing dikes in the project area were constructed in the early 1930's (1932 and 1935 aerial photographs). No dikes predating this period are present in the 1932 aerial photograph. The dikes were constructed of wood pile or stone or stone over wood pile. According to project engineers, these dikes are similar to thousands of others along the Mississippi River.

In the highly unlikely event archaeological deposits or historic sits are discovered during the project, construction activity in the immediate area will halt until the site is evaluated. The site will be protected from construction impacts until its eligibility for the National Register is determined, in consultation with your office and any appropriate mitigation is complete.

The St. Louis District is looking forward to consulting with your office to ensure that the project is designed to avoid any effect to significant historic properties. If you have any questions, please contact Ms. Suzanne E. Harris, of my staff at (314) 331-8467.

Sincerely,

Owen D. Dutt
Chief, Environmental Analysis Branch

Enclosures

Harris, Suzanne E MVS

From: Judith Deel [nrdeelj@mail.dnr.state.mo.us]
Sent: Thursday, October 25, 2001 8:36 AM
To: Harris, Suzanne E MVS
Cc: Steve Mitchell
Subject: Re: SCHENIMANN CHUTE PROJECT,

Suzanne, according to our 106 log, I wrote a reply to this project on 8-29-01, but there is no indication that it has been signed or mailed. I will see if it has been held up. Sometimes these project replys are sent to the Director's Office to incorporate into a department wide reply.

The HPP Log number is U503, just for the record.

Judith Deel
State Historic Preservation Office
Missouri Department of Natural Resources
P.O. Box 176
Jefferson City, MO 65102
573/751-7862
nrdeelj@mail.dnr.state.mo.us

"Harris, Suzanne E MVS"
<Suzanne.E.Harris@mvs02.usace.army.mil>

10/18/2001 09:05 AM

To: "'Judith Deel'" <nrdeelj@mail.dnr.state.mo.us>
cc: "Harris, Suzanne E MVS"
<Suzanne.E.Harris@mvs02.usace.army.mil>
Subject: SCHENIMANN CHUTE PROJECT, COMMENTS?

Judy,

On August 27, 2001, your office received a letter with our plans for NHPA, section 106 compliance on the Schenimann Chute Side Channel Protection and Enhancement Project, Upper Mississippi River System - Environmental Management Program, Cape Girardeau County. Most of the project will be in land accreted since the 1930's.

1. Does you agency agree with the historic properties compliance approach outlined in the letter?
2. Does your agency have any specific concerns or questions about the historic properties compliance?
3. Will you provide us with a response to include in the Environmental Assessment?

Thanks! Hope things are going well!

Suzanne

also provide views on their own initiative for the agency official to consider in decisionmaking.

(3) *Use of agency procedures.* The agency official may use the agency's procedures for public involvement under the National Environmental Policy Act or other program requirements in lieu of public involvement requirements in subpart B of this part, if they provide adequate opportunities for public involvement consistent with this subpart.

Subpart B—The section 106 Process

§ 800.3 Initiation of the section 106 process.

(a) *Establish undertaking.* The agency official shall determine whether the proposed Federal action is an undertaking as defined in § 800.16(y) and, if so, whether it is a type of activity that has the potential to cause effects on historic properties.

(1) *No potential to cause effects.* If the undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the agency official has no further obligations under section 106 or this part.

(2) *Program alternatives.* If the review of the undertaking is governed by a Federal agency program alternative established under § 800.14 or a programmatic agreement in existence before January 11, 2001, the agency official shall follow the program alternative.

(b) *Coordinate with other reviews.* The agency official should coordinate the steps of the section 106 process, as appropriate, with the overall planning schedule for the undertaking and with any reviews required under other authorities such as the National Environmental Policy Act, the Native American Graves Protection and Repatriation Act, the American Indian Religious Freedom Act, the Archeological Resources Protection Act, and agency-specific legislation, such as section 4(f) of the Department of Transportation Act. Where consistent with the procedures in this subpart, the agency official may use information developed for other reviews under Federal, State, or tribal law to meet the requirements of section 106.

(c) *Identify the appropriate SHPO and/or THPO.* As part of its initial planning, the agency official shall determine the appropriate SHPO or SHPOs to be involved in the section 106 process. The agency official shall also determine whether the undertaking may occur on or affect historic properties on any tribal lands and, if so, whether a THPO has assumed the duties of the SHPO. The agency official shall then initiate consultation with the appropriate officer or officers.

(1) *Tribal assumption of SHPO responsibilities.* Where an Indian tribe has assumed the section 106 responsibilities of the SHPO on tribal lands pursuant to section 101(d)(2) of the act, consultation for undertakings occurring on tribal land or for effects on tribal land is with the THPO for the Indian tribe in lieu of the SHPO. Section 101(d)(2)(D)(iii) of the act authorizes owners of properties on tribal lands which are neither owned by a member of the tribe nor held in trust by the Secretary for the benefit of the tribe to request the SHPO to participate in the section 106 process in addition to the THPO.

(2) *Undertakings involving more than one State.* If more than one State is involved in an undertaking, the involved SHPOs may agree to designate a lead SHPO to act on their behalf in the section 106 process, including taking actions that would conclude the section 106 process under this subpart.

(3) *Conducting consultation.* The agency official should consult with the SHPO/THPO in a manner appropriate to the agency planning process for the undertaking and to the nature of the undertaking and its effects on historic properties.

(4) *Failure of the SHPO/THPO to respond.* If the SHPO/THPO fails to respond within 30 days of receipt of a request for review of a finding or determination, the agency official may either proceed to the next step in the process based on the finding or determination or consult with the Council in lieu of the SHPO/THPO. If the SHPO/THPO re-enters the Section 106 process, the agency official shall continue the consultation without being required to reconsider previous findings or determinations.

(d) *Consultation on tribal lands.* Where the Indian tribe has not assumed the responsibilities of the SHPO on tribal lands, consultation with the Indian tribe regarding undertakings occurring on such tribe's lands or effects on such tribal lands shall be in addition to and on the same basis as consultation with the SHPO. If the SHPO has withdrawn from the process, the agency official may complete the section 106 process with the Indian tribe and the Council, as appropriate. An Indian tribe may enter into an agreement with a SHPO or SHPOs specifying the SHPO's participation in the section 106 process for undertakings occurring on or affecting historic properties on tribal lands.

(e) *Plan to involve the public.* In consultation with the SHPO/THPO, the agency official shall plan for involving the public in the section 106 process. The agency official shall identify the appropriate points for seeking public input and for notifying the public of proposed actions, consistent with § 800.2(d).

(f) *Identify other consulting parties.* In consultation with the SHPO/THPO, the agency official shall identify any other parties entitled to be consulting parties and invite them to participate as such in the section 106 process. The agency official may invite others to participate as consulting parties as the section 106 process moves forward.

(1) *Involving local governments and applicants.* The agency official shall invite any local governments or applicants that are entitled to be consulting parties under § 800.2(c).

(2) *Involving Indian tribes and Native Hawaiian organizations.* The agency official shall make a reasonable and good faith effort to identify any Indian tribes or Native Hawaiian organizations that might attach religious and cultural significance to historic properties in the area of potential effects and invite them to be consulting parties. Such Indian tribe or Native Hawaiian organization that requests in writing to be a consulting party shall be one.

(3) *Requests to be consulting parties.* The agency official shall consider all written requests of individuals and organizations to participate as consulting parties and, in consultation with the SHPO/THPO and any Indian tribe upon whose tribal lands an undertaking occurs or affects historic properties, determine which should be consulting parties.

(g) *Expediting consultation.* A consultation by the agency official with the SHPO/THPO and other consulting parties may address multiple steps in §§ 800.3 through 800.6 where the agency official and the SHPO/THPO agree it is appropriate as long as the consulting parties and the public have an adequate opportunity to express their views as provided in § 800.2(d).

§ 800.4 Identification of historic properties.

(a) *Determine scope of identification efforts.* In consultation with the SHPO/THPO, the agency official shall:

(1) Determine and document the area of potential effects, as defined in § 800.16(d);

(2) Review existing information on historic properties within the area of potential effects, including any data

concerning possible historic properties not yet identified;

(3) Seek information, as appropriate, from consulting parties, and other individuals and organizations likely to have knowledge of, or concerns with, historic properties in the area, and identify issues relating to the undertaking's potential effects on historic properties; and

(4) Gather information from any Indian tribe or Native Hawaiian organization identified pursuant to § 800.3(f) to assist in identifying properties, including those located off tribal lands, which may be of religious and cultural significance to them and may be eligible for the National Register, recognizing that an Indian tribe or Native Hawaiian organization may be reluctant to divulge specific information regarding the location, nature, and activities associated with such sites. The agency official should address concerns raised about confidentiality pursuant to § 800.11(c).

(b) *Identify historic properties.* Based on the information gathered under paragraph (a) of this section, and in consultation with the SHPO/THPO and any Indian tribe or Native Hawaiian organization that might attach religious and cultural significance to properties within the area of potential effects, the agency official shall take the steps necessary to identify historic properties within the area of potential effects.

(1) *Level of effort.* The agency official shall make a reasonable and good faith effort to carry out appropriate identification efforts, which may include background research, consultation, oral history interviews, sample field investigation, and field survey. The agency official shall take into account past planning, research and studies, the magnitude and nature of the undertaking and the degree of Federal involvement, the nature and extent of potential effects on historic properties, and the likely nature and location of historic properties within the area of potential effects. The Secretary's standards and guidelines for identification provide guidance on this subject. The agency official should also consider other applicable professional, State, tribal, and local laws, standards, and guidelines. The agency official shall take into account any confidentiality concerns raised by Indian tribes or Native Hawaiian organizations during the identification process.

(2) *Phased identification and evaluation.* Where alternatives under consideration consist of corridors or large land areas, or where access to properties is restricted, the agency official may use a phased process to conduct identification and evaluation efforts. The agency official may also defer final identification and evaluation of historic properties if it is specifically provided for in a memorandum of agreement executed pursuant to § 800.6, a programmatic agreement executed pursuant to § 800.14(b), or the documents used by an agency official to comply with the National Environmental Policy Act pursuant to § 800.8. The process should establish the likely presence of historic properties within the area of potential effects for each alternative or inaccessible area through background research, consultation and an appropriate level of field investigation, taking into account the number of alternatives under consideration, the magnitude of the undertaking and its likely effects, and the views of the SHPO/THPO and any other consulting parties. As specific aspects or locations of an alternative are refined or access is gained, the agency official shall proceed with the identification and evaluation of historic properties in accordance with paragraphs (b)(1) and (c) of this section.

(c) *Evaluate historic significance.*

(1) *Apply National Register criteria.* In consultation with the SHPO/THPO and any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to identified properties and guided by the Secretary's standards and guidelines for evaluation, the agency official shall apply the National Register criteria (36 CFR part 63) to properties identified within the area of potential effects that have not been previously evaluated for National Register eligibility. The passage of time, changing perceptions of significance, or incomplete prior evaluations may require the agency official to reevaluate properties previously determined eligible or ineligible. The agency official shall acknowledge that Indian tribes and Native Hawaiian organizations possess special expertise in assessing the eligibility of historic properties that may possess religious and cultural significance to them.

(2) *Determine whether a property is eligible.* If the agency official determines any of the National Register criteria are met and the SHPO/THPO agrees, the property shall be considered eligible for the National Register for section 106 purposes. If the agency official determines the criteria are not met and the SHPO/THPO agrees, the property shall be considered not eligible. If the agency official and the SHPO/THPO do not agree, or if the Council or the Secretary so request, the agency official shall obtain a determination of eligibility from the Secretary pursuant to 36 CFR part 63. If an Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to a property off tribal lands does not agree, it may ask the Council to request the agency official to obtain a determination of eligibility.

(d) *Results of identification and evaluation.*

(1) *No historic properties affected.* If the agency official finds that either there are no historic properties present or there are historic properties present but the undertaking will have no effect upon them as defined in § 800.16(i), the agency official shall provide documentation of this finding, as set forth in § 800.11(d), to the SHPO/THPO. The agency official shall notify all consulting parties, including Indian tribes and Native Hawaiian organizations, and make the documentation available for public inspection prior to approving the undertaking. If the SHPO/THPO, or the Council if it has entered the section 106 process, does not object within 30 days of receipt of an adequately documented finding, the agency official's responsibilities under section 106 are fulfilled.

(2) *Historic properties affected.* If the agency official finds that there are historic properties which may be affected by the undertaking or the SHPO/THPO or the Council objects to the agency official's finding under paragraph (d)(1) of this section, the agency official shall notify all consulting parties, including Indian tribes or Native Hawaiian organizations, invite their views on the effects and assess adverse effects, if any, in accordance with § 800.5.

§ 800.5 Assessment of adverse effects.

(a) *Apply criteria of adverse effect.* In consultation with the SHPO/THPO and any Indian tribe or Native Hawaiian organization that attaches religious and cultural significance to identified historic properties, the agency official shall apply the criteria of adverse effect to historic properties within the area of potential effects. The agency official shall consider any views concerning such effects which have been provided by consulting parties and the public.

(1) *Criteria of adverse effect.* An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association. Consideration shall be given to all

DEPARTMENT OF THE ARMY
ST. LOUIS DISTRICT, CORPS OF ENGINEERS
1222 SPRUCE STREET
ST. LOUIS, MISSOURI 63103-2833

REPLY TO
ATTENTION OF:

SEP 10 2001

Engineering Division
Curation and Archives
Analysis Branch

Mr. Lee Edwards, Governor
Absentee-Shawnee Executive Committee
2025 S. Gordon Cooper Drive
Shawnee, Oklahoma 74810-9381

Dear Governor Edwards:

This letter addresses proposed earthmoving activities (Schenimann Chute Side Channel Protection and Enhancement Project) on the Middle Mississippi River System, Cape Girardeau County, Missouri. The project is located on the right descending bank of the Mississippi River, approximately five miles north of Cape Girardeau, Missouri. Schenimann Chute is one of 23 side channels that remain along the 202 miles of open river between St. Louis, Missouri, and the mouth of the Ohio River at Cairo, Illinois (see attached maps).

The Schenimann Chute side channel has been degraded by the accumulation of sediment and without action will become part of the adjacent land, thus eliminating an important habitat component of the open river ecosystem. The proposed project includes notching the existing stone dikes (constructed in the 1930s), constructing stub dikes and/or hard points, placing revetments, and dredging approximately 75,000 cubic yards of sand at the lower end of the chute to improve connectivity with the river. Construction would occur in three phases: notching of dikes, placement of rock, and dredging of the lower end of the channel.

The result of this project would improve aquatic habitat diversity by moving sediment, reducing bank erosion, creating scour holes and plunge pools, and deepening the downstream connection with the river. The resulting deep water would provide off-channel habitat for the pallid sturgeon, a federally endangered species; over wintering, spawning and rearing of fishes; and resting/feeding sites for migratory birds and other wetland species.

There are no known historic properties (prehistoric or historic archaeological sites or structures) within the project area. The Archaeological Survey of Missouri does not have any sites recorded in the project area. Moreover, most, if not all, land adjacent to the Chute was accreted by the Mississippi River within the last one hundred years, and, therefore, will not contain prehistoric archaeological sites. All land on the left descending (east) bank was created by pile dikes placed from the then right descending (west) Mississippi bank into the river channel in the early 1930s. Land accretion and chute development are documented by aerial photographs taken in 1932 and 1935 during dike construction and another aerial photograph taken in 1965 after full development of the left descending (east) bank or "islands." In addition, unpublished information (i.e., a map) from Claude Strauser, then District Potamologist, indicates that various parts of the land on the Chute's right descending (west) bank were reworked by the Mississippi River around 1919, 1907, and/or 1899. Supporting this, the soils on both sides of the Chute have been classified as Caruthersville series and Commerce series, which both formed in recent alluvium along the Mississippi River.

The project, as planned, would avoid any effect to significant historic properties. Most construction would be confined to accreted lands or previously disturbed areas, or it would be modifications of existing dikes. Areas will be surveyed to locate any historic properties for any proposed project elements not located on accreted ground. In the highly unlikely event any cultural properties are located, these will be evaluated for National Register eligibility in consultation with the Missouri Historic Preservation Officer, and appropriate mitigation will be completed before construction. In the highly unlikely event archaeological deposits or historic sites are discovered during the project, construction activity in the immediate area will halt until the site is evaluated. The site will be protected from construction impacts until its eligibility for the National Register is determined.

The southern end of the Rivers Project is not encompassed within any judicially established aboriginal territory. Therefore, all of the following tribes are being notified regarding the Schenimann Chute Side Channel Protection and Enhancement Project as potential claimants because of their prehistoric or historic association or their expressed interest in the Mississippi River area.

Delaware Tribe of Indians, Oklahoma
Delaware Nation
Hannahville Indian Community of Michigan
Citizen Band Potawatomi Indian Tribe of Oklahoma
Forest County Potawatomi Indians
Pokagon Band of Potawatomi Indians of Michigan
Huron Potawatomi Nation
Prairie Band of Potawatomi Indians of Kansas
Gun Lake Potawatomi
Kickapoo Tribe of Oklahoma
Kickapoo Traditional Tribe of Texas
Kickapoo Tribe of Kansas
Miami Tribe of Oklahoma
Peoria Tribe of Oklahoma
Quapaw Tribe of Oklahoma
Ho-Chunk Nation of Wisconsin
Winnebago Tribe of Nebraska
Osage Nation
Cherokee Nation of Oklahoma
Eastern Band of Cherokee
United Keetoowah Band of Cherokee of Oklahoma
Sac & Fox Nation of Oklahoma
Sac & Fox Tribe of the Mississippi in Iowa
Sac & Fox Nation of Missouri in Kansas and Nebraska
Absentee-Shawnee Tribe of Oklahoma
Eastern Shawnee Tribe of Oklahoma
Shawnee Tribe
Iowa Tribe of Kansas and Nebraska
Iowa Tribe of Oklahoma

If you have any further questions or need additional information, please contact Ms. Roberta L. Hayworth, St. Louis District Native American Coordinator, at (314) 331-8833.

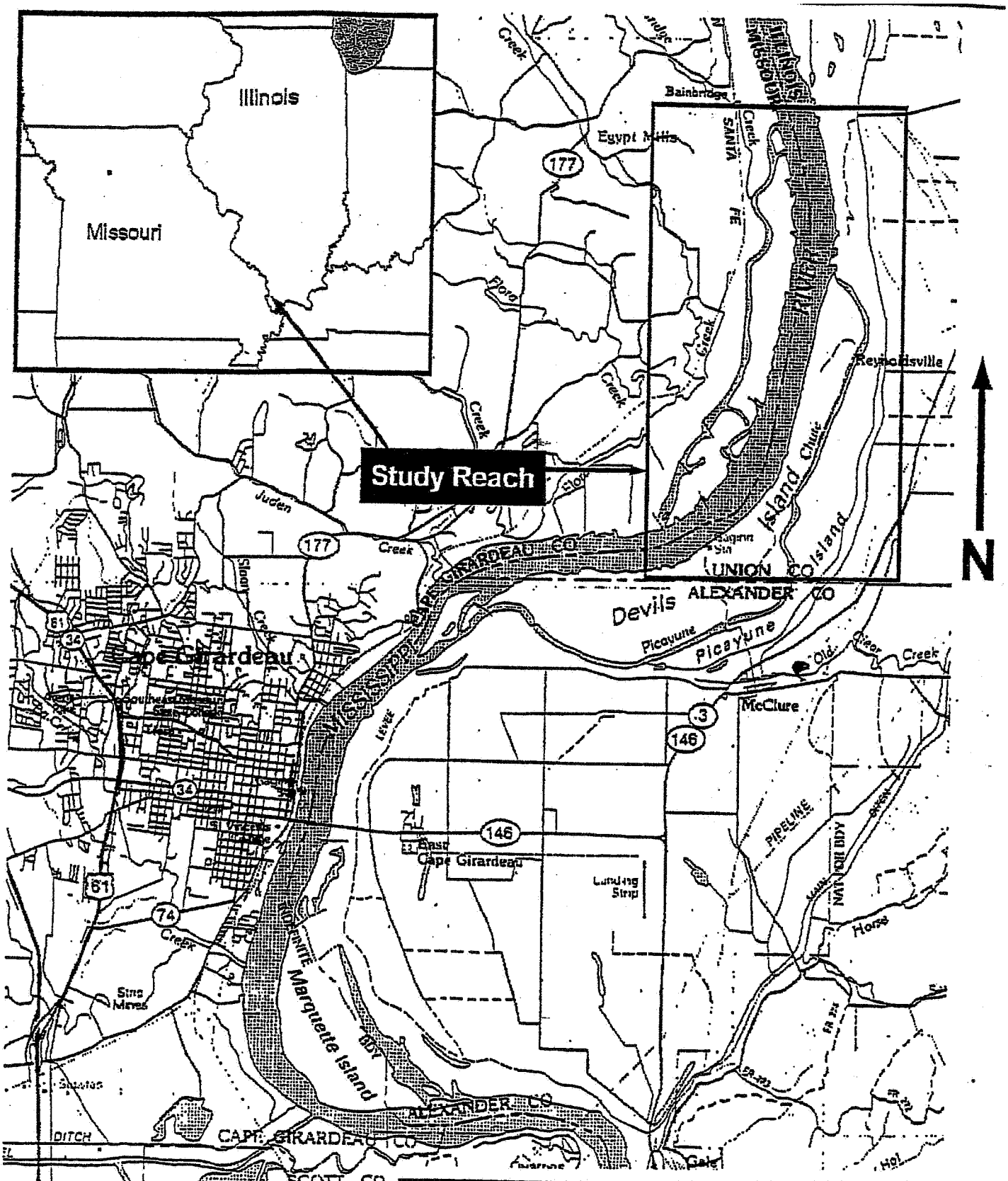
Sincerely,

Michael R. Morrow
Colonel, U.S. Army
District Engineer

Enclosures

Copy Furnished:

Mr. Henry Tiger
NAGPRA Representative



U.S. ARMY ENGINEER DISTRICT, ST LOUIS
CORPS OF ENGINEERS
ST LOUIS, MISSOURI

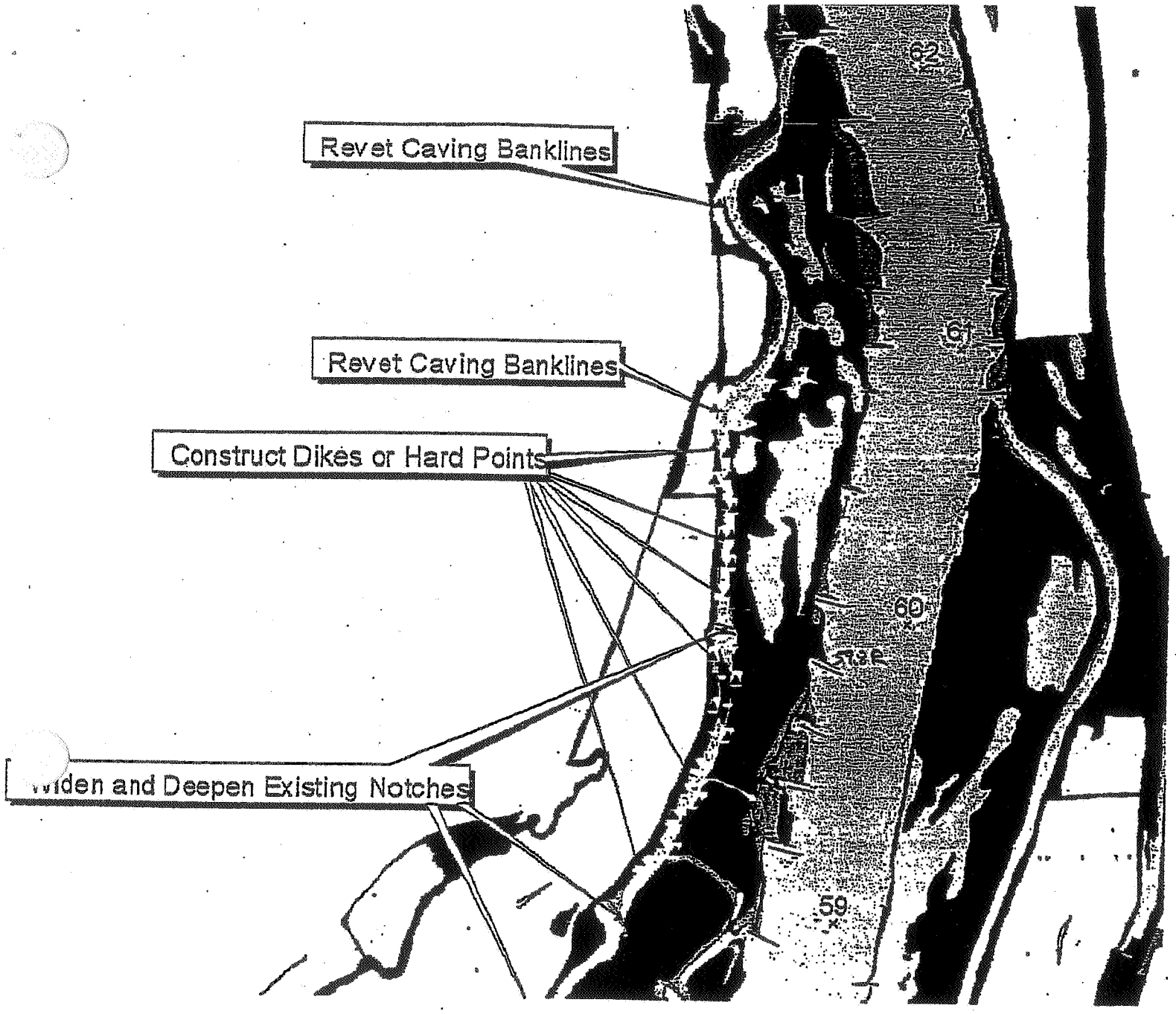
PREPARED BY: A. Rhoads
CHECKED BY: R. Dewbrey

SCHENIMANN CHUTE MICRO MODEL STUDY
MISSISSIPPI RIVER MILES 63 TO 57

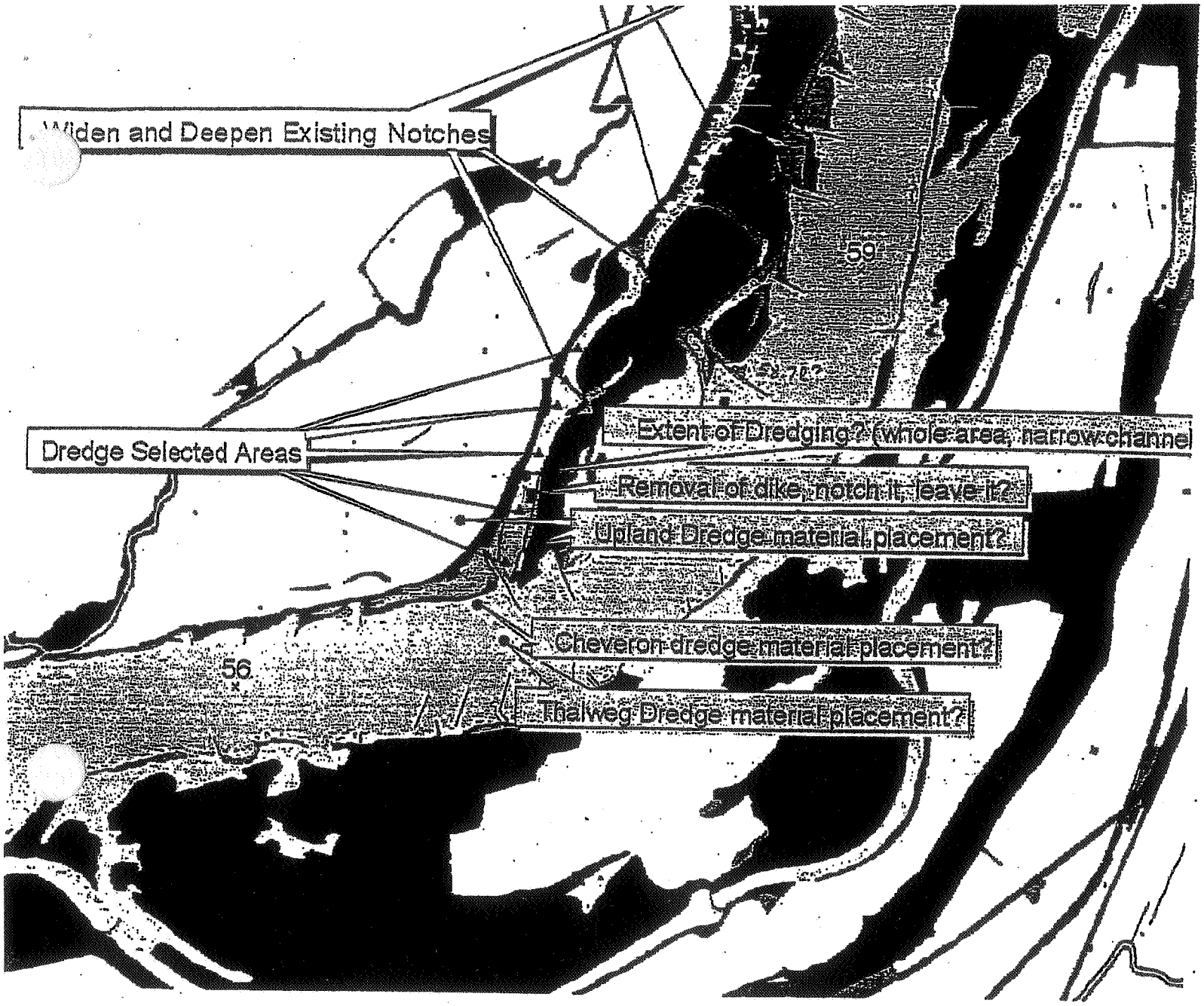
LOCATION AND VICINITY MAP OF THE STUDY REACH

I-11

PLATE NO. 1



Schenimann North Half



- Alternative variations.shp
- Umr_pnt_rm.shp
- Mm recommendations.shp
- Dikes.shp
- Hardpoints.shp

Hna89l29.shp

- Open Water
- Submersed Aquatic Bed
- Floating-Leaved Aquatic Bed
- Semi-permanently Flooded Emergent Perennial
- Semi-permanently Flooded Emergent Annual
- Seasonally Flooded Emergent Annual
- Seasonally Flooded Emergent Perennial
- Wet Meadow
- Grassland
- Scrub/Shrub
- Salix Community
- Populus Community
- Wet Floodplain Forest
- Mesic Bottomland Hardwood Forest
- Sand/Mud
- Agriculture
- Developed
- No Photo Coverage

3000 0 3000 6000 Feet

Schenimann South Half

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APPENDIX J

HAZARDOUS, TOXIC AND RADIOACTIVE WASTE

SCHENIMANN CHUTE EMP PROJECT
HTRW INITIAL ASSESSMENT (IA)
Cape Girardeau, Missouri

Prepared for:

U.S. Army Corps of Engineers
St. Louis District
1222 Spruce Street
St. Louis, MO 63103-2833

Prepared by:

Amy Ruemmler
Environmental Scientist
ARDL, Inc.

Approved by:

Todd Gentles
Environmental Services Manager
ARDL, Inc.

Date Prepared: 19 March 2002

Date of Approval: 8 Apr 02

Approved by:

L.V. Gibbons, Ph.D.
President and Laboratory Director
ARDL, Inc.

Approved by:

Theodore S. Postol, P.E.
Chief, Environmental Quality Section
U.S. Army Corps of Engineers
St. Louis District (CELMS-ED-HQ)

Prepared Under Contract: DACW43-99-D-0509
Delivery No. 0023

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(Continued)

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LIST OF FIGURES

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1.0 EXECUTIVE SUMMARY

The purpose of the Schenimann Chute EMP Project is to construct a series of alternating dikes or hard points between Miles 60.5 and 59.0 to create additional physical and biological diversity and artificially dredge a number of areas in the lower end of Schenimann Chute between Miles 58.7 and 57.0 to create additional water habitat. The project area must be investigated for recognized environmental conditions of a hazardous classification. This report has been prepared to satisfy that requirement and to address the impact of the recognized environmental conditions identified in the project area.

This Phase I Environmental Assessment was performed in accordance with the Scope of Work and ASTM Practice E 1527-00. The findings and conclusions for the Phase I are no recognized environmental conditions exist on or in close proximity to the project.

The possible use of pesticides and/or herbicides on adjacent properties appear to pose a low risk for environmental impact on the project. No evidence of overstressed vegetation or misuse of pesticide/herbicides was observed or documented for the project area. The use of pesticides and/or herbicides on adjacent properties can be considered a deminimis condition for the subject project area.

Barge traffic of bulk material within the Mississippi River poses a low risk of environmental impact to the subject property. Any reported incident which may occur would be required to be remediated fully by the responsible barge line as mandated by state and federal regulations. No such incidents have been reported within or in close proximity to the project area. Barge traffic along the Mississippi River can be considered a deminimis condition for the subject project area.

Railroad traffic paralleling Schenimann Chute to the West poses a low risk of environmental impact to the subject property. Any reported incidents which may occur would be required to be remediated fully by the railroad as mandated by state and federal regulations. No such incidents have been reported within or in the close proximity to the project area. Railroad traffic can be considered a deminimis condition for the subject project area.

2.0 INTRODUCTION

The Corps of Engineers has developed plans to construct a series of alternating dikes or hard points between Miles 60.5 and 59.0 to create additional physical and biological diversity and artificially dredge a number of areas in the lower end of Schenimann Chute between Miles 58.7 and 57.0 to create additional water habitat. As a part of the process of determining the current site's environmental status, a HTRW Initial Assessment (IA) must be performed to determine any recognized environmental conditions, which could be associated with the project area. The project area is approximately 5 river miles in length along the right descending bank.

This report is being submitted to address the requirement for an HTRW IA of the project site.

2.1 Project Purpose and Scope

The purpose of this HTRW IA is to identify recognized environmental conditions. A recognized environmental conditions as defined by ASTM E 1527-00 means "the presence or likely presence of any hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into ground, groundwater, or surface water of the property. The term includes hazardous substances or petroleum products even under conditions in compliance with laws. The term is not intended to include deminimis conditions that generally do not present a material risk of harm to public health or the environment and that generally would not be the subject of an enforcement action if brought to the attention of appropriate governmental agencies."

This HTRW IA has been performed in accordance with the Scope of Work. As specified in the Scope of Work, the HTRW IA conforms to the ASTM Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment E 1527-00 version.

2.2 Project Authorization

The HTRW IA project for the Schenimann Chute EMP Project was authorized by Delivery Order Number 23 under Contract Number DACW43-99-D-0509.

3.0 SITE DESCRIPTION

3.1 Location

The project area is located approximately five (5) miles north of Cape Girardeau, Missouri along the right descending shoreline of the Mississippi River between River Mile 57 to 62. This area is depicted in *Figures 1 and 2.*

3.2 Site and Vicinity Characteristics

The chute receives an influx of water from a natural drainage system which drains approximately 2 to 3 square miles of uplands that enters the chute within the first (Northernmost) chamber of the Schemimann Chute in addition to the Mississippi River water. The project area is rural in nature with no commercial or industrial developments. Recreational use (i.e. fishing) and habitat enhancement are the primary uses of the subject property. The subject property is under the control of the U.S. Army Corps of Engineers.

The Mississippi River borders the property on the east and serves as a transportation corridor for bulk materials shipped by barges. All other adjoining properties are utilized primarily for agricultural purposes with the exception of a rail line that exists along the western boundary of the adjacent properties.

3.3 Descriptions of Structures, Roads and Other Improvements On-Site

As part of the Corps of Engineers river control engineering efforts, the Schenimann Chute has had various control measures implemented, which have impacted the flow conditions of the chute as well as the river. Approximately 75 years ago wooden dikes were installed which traversed through the chute and extended into the River. The wooden dikes have deteriorated to a point that their control efforts are minimal. In more recent years, three (3) closure structures have been maintained within the chute separating the chute into four (4) chambers during low river stages. These closure structures are primarily constructed with large boulders and riprap material. No other structures, roads or other improvements exist within the Schemimann Chute Project area. In addition, no power distribution lines, buried telephone lines or pipelines exist on the subject property.

3.4 Environmental Liens, Specialized Knowledge or Experience

The determination of ownership of the subject property was not included in the scope of this project.

3.5 Past and Current Uses of the Property

All information readily available indicated that the project area has historically been used primarily for recreational or habitat enhancement purposes.

3.6 Current and Past Uses of Adjoining Properties

The majority of adjoining properties have historically been used for agricultural and residential purposes. One residential cabin is located along Schenimann Chute adjacent to the north end of the subject property.

3.7 Site Map

Figures 1 and 2 depict the general and detailed project location.

FIGURE 1-GENERAL AREA MAP

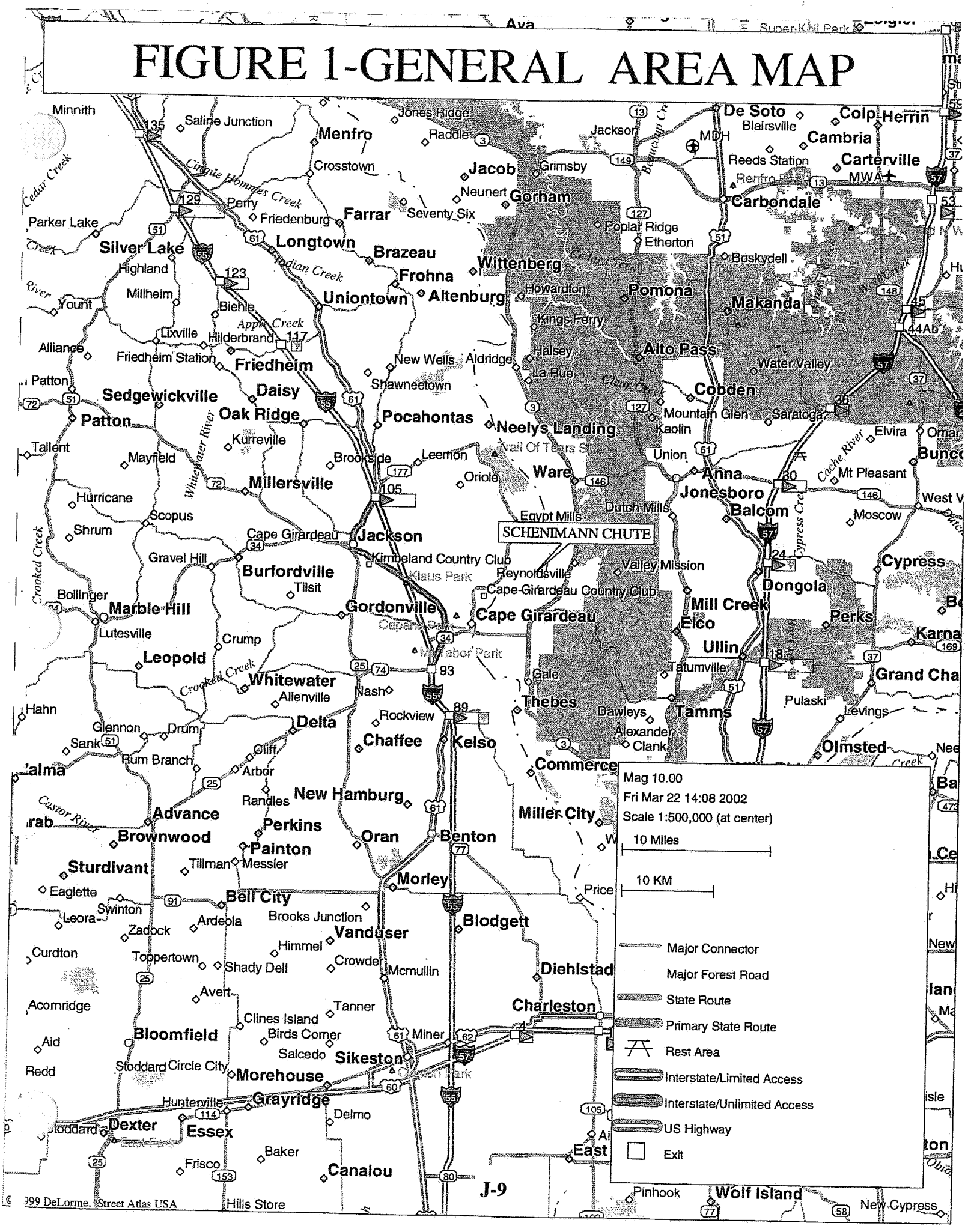
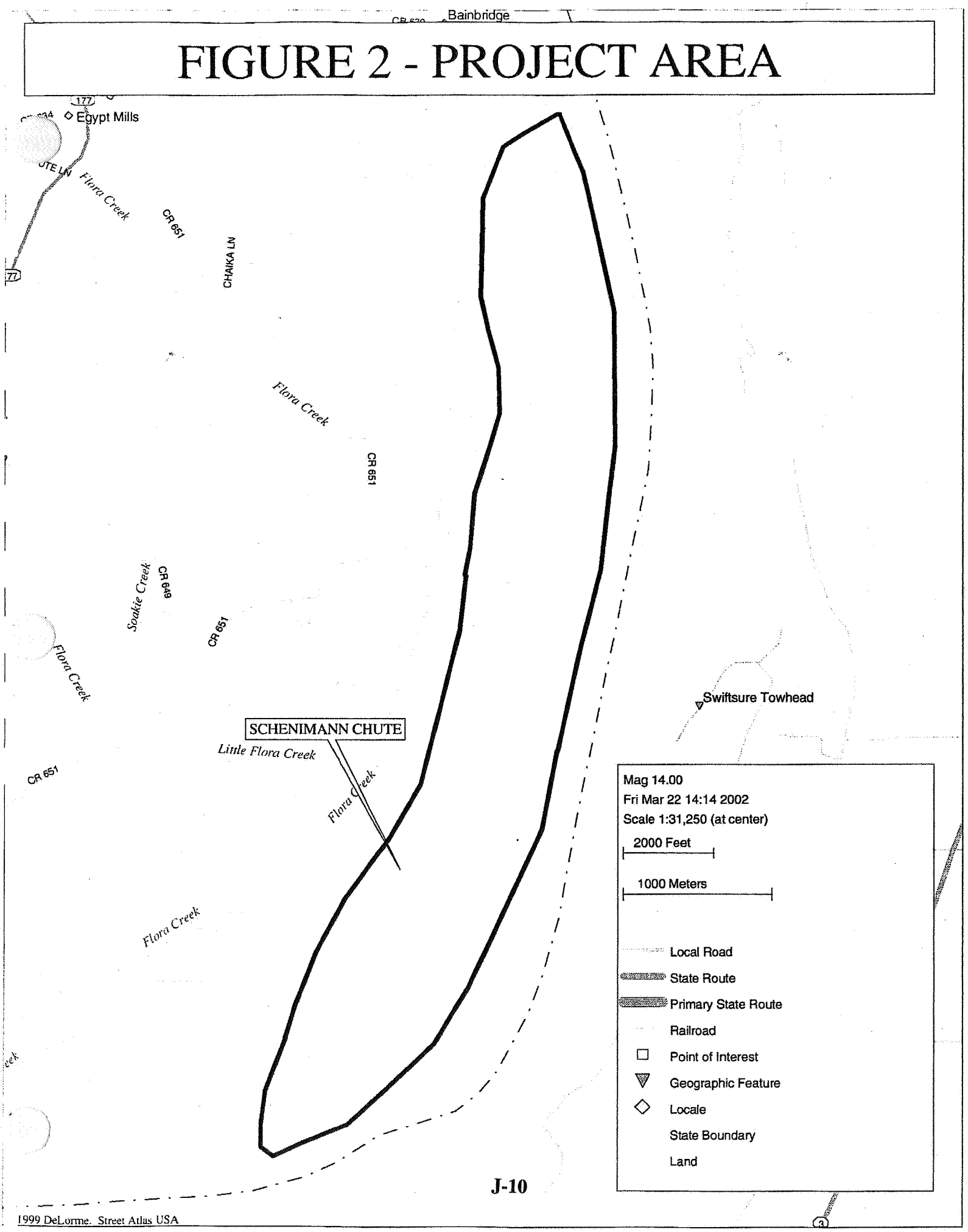


FIGURE 2 - PROJECT AREA



J-10

1999 DeLorme. Street Atlas USA

4.0 Records Review

4.1 Standard Environmental Record Sources, Federal and State

A records search was requested from EDR, Inc. of all available "reasonably ascertainable" government records. The following databases were searched for this project.

DATABASES SEARCHED

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
Delisted NPL	NPL Deletions
RCRIS-TSD	Resource Conservation and Recovery Information System
SHWS	State Haz. Waste
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	Comprehensive Environmental Response, Compensation, and Liability Information System-No Further Remedial Action Planned
CORRACTS	Corrective Action Report
SWF/LF	Solid Waste Disposal Areas & Processing Facilities
LUST	Leaking Underground Storage Tanks
UST	Underground Storage Tank Information
AST	Aboveground Petroleum Storage Tanks
VCP	Sites Participating in the Voluntary Cleanup Program
RAATS	RCRA Administrative Action Tracking System
RCRIS-SQG	Resource Conservation and Recovery Information System
RCRIS-LQG	Resource Conservation and Recovery Information System
HMIRS	Hazardous Materials Information Reporting System
PADS	PCB Activity Database System
ERNS	Emergency Response Notification System
FINDS	Facility Index System
TRIS	Toxic Chemical Release Inventory System
NPL Lien	NPL Liens
TSCA	Toxic Substances Control Act
FTTS	FIFRA/TSCA Tracking System – FIFRA (Federal Insecticide, Fungicide and Rodenticide Act)/TSCA (Toxic Substances Control Act)
MLTS	Material Licensing Tracking System
ROD	Record of Decision
CONSENT	Superfund (CERCLA) Consent Decrees
MO RRC	Certifed Hazardous Waste Resource Recovery Facilities
MINES	Mines Master Index File

The search results revealed that no mapped sites were found for the parcels or the surrounding search distances as specified per ASTM Standard E 1527-00. A total of twenty-six (26) sites were not mapped due to inadequate address information within the searched databases. An effort was made by the site reconnaissance team to locate the "orphan" unmapped sites during the conductance of the site reconnaissance. Of the twenty-six unmapped sites none of the sites were determined to be within the project area.

A copy of the complete environmental records search performed for the project is attached as *Appendix 1*.

4.2 Physical Setting Sources

Five (5) historical topographical maps were reviewed for the project locations and surrounding area. The historical topographic maps were for the years 1996, 1993, 1990, 1978 and 1948. No major development was indicated on or in the surrounding area.

Topographical maps reviewed as a part of this assessment are enclosed as *Appendix 1* with the environmental records data.

4.3 Historical Use Information

Historical aerial photographs were not readily available for the project location and/or surrounding area.

4.4 Additional Record Sources

The final report for the Mississippi River/Schenimann Chute entitled *Review and Analysis of Aquatic Monitoring Data, Mississippi River Mile 57 to 62 Right Descending Bank* prepared by ARDL, Inc. for the U.S. Army Corps of Engineers-St. Louis District on 15 November 1996 was reviewed as an additional record source for this project. This report concluded the Schnenimann Chute to be a productive environment for benthic invertebrate and as a fish habitat. In addition, the surface runoff from Bainbridge Creek may be a contributing factor in the environmental quality of the Chute.

No other additional record sources were reviewed in conjunction with this project. The records reviewed and reported above were deemed sufficient to adequately assess the recognized environmental conditions for the subject location.

5.0 INFORMATION FROM THE SITE RECONNAISSANCE AND INTERVIEWS

5.1 Hazardous Substances In Connection With Identified Uses

The identified uses of the area are recreational and for habitat enhancement. Adjoining property is currently used for agriculture purposes; therefore, the use of herbicides and pesticides is a possible recognized environmental condition for the adjacent properties.

The site reconnaissance was conducted by driving the surrounding public access roads in the area and a walk over of the adjacent properties along the western boundary of the subject property. The site visit did not reveal

any observable hazardous substances that could be attributed to the identified uses of the area or the surrounding lands.

An interviews was conducted with the Mr. Jim Hanks, Chief, of the East County Fire Protection. To the best of his knowledge, there are no known hazardous substances associated with the Schinemann Chute nor has there been any incidents concerning hazardous substances occurred on or in the vicinity in the last twenty-one years.

5.2 Hazardous and Unidentified Substance Containers

The site reconnaissance did not reveal any hazardous and/or unidentified substance containers in the immediate area (i.e. ¼ mile of the subject property). Discarded Railroad signal batteries were found along the Railroad Right of Way west of the subject property. The batteries were discarded at a location approximately ¼ mile from the subject property.

5.3 Storage Tanks

There was no evidence of aboveground or underground storage tanks within the subject property or surrounding area. No vent pipes were observed during the site reconnaissance.

5.4 PCB's

No Electrical power distribution lines were observed adjacent to the subject property. No hydraulic equipment was observed on or near the subject property. The sites are void of any commercial or industrial development and therefore the likelihood of PCB's being present is negligible.

5.5 Indication of Solid Waste Disposal

The site reconnaissance did not reveal any visible indication of solid waste disposal on the target property. No open dumping was observed or any suspicious depressions seen on the property, which would indicate burial of solid waste. Adjacent property to the west revealed a minimal amount of solid waste disposal. Small amounts of general refuse were observed and one discarded household refrigerator was observed on the adjoining property.

5.6 Physical Setting Analysis

The project location is within the Mississippi River drainage basin. No major topographical changes were observed at the time of the site

reconnaissance when compared to the most current and historical topographical maps.

5.7 Any Other Conditions of Concern

No other conditions of concern were identified during the site reconnaissance.

5.8 Site Plan and Photographs

Vicinity maps for the project location are enclosed as *Figures 1 and 2*. Photographs taken during the site visit are attached as *Appendix 2*

6.0 OPINION

The environmental professionals who have conducted the site visit and reviewed the results of the data collection effort have concluded that no "recognized environmental conditions" exist for the subject property. Three deminimis site conditions were noted for the subject property, which relate to adjoining property use. It is up to the user of this report, based on his or her risk tolerance, fiduciary responsibility or the applicable law, to determine the extent of further inquiry.

Recognized Environmental Condition	Potential Impact
Pesticide and/or Herbicide Application on Agricultural Lands	Deminimis
Barge Transportation of Bulk Material on the Adjacent Mississippi River	Deminimis
Railroad Transportation on Adjacent Property	Deminimis

7.0 FINDINGS AND CONCLUSIONS

ARDL, Inc. has performed a Phase I Environmental Assessment in conformance with the scope and limitations of ASTM Practice E 1527 of the Schenimann Chute EMP Project. This assessment has revealed no evidence of recognized environmental conditions in connection with the project location except for the following deminimis conditions relating to the use of adjoining property:

Recognized Environmental Conditions (REC)

1. Pesticide and/or Herbicide Application on Adjacent Agricultural Lands
2. Barge Transportation of Bulk Material on the Adjacent Mississippi River
3. Railroad Transportation on Adjacent Lands.

The possible use of pesticides and/or herbicides on adjacent properties appear to pose a low risk for environmental impact on the project. No evidence of overstressed vegetation or misuse of pesticide/herbicides was observed or documented for the project area.

Barge traffic of bulk material within the Mississippi River poses a low risk of environmental impact to the subject property. Any reported incident which may occur would be required to be remediated fully by the responsible barge line as mandated by state and federal regulations.

Railroad traffic paralleling Schenimann Chute to the West poses a low risk of environmental impact to the subject property. Any reported incidents which may occur would be required to be remediated fully by the railroad as mandated by state and federal regulations. No such incidents have been reported within or in the close proximity to the project area.

8.0 QUALIFICATIONS OF ENVIRONMENTAL PROFESSIONALS

The qualifications of the environmental professional who conducted and prepared this Phase I Environmental Site Assessment are enclosed as *Appendix 3.*

9.0 LIMITATIONS

ARDL, Inc. should be contacted with any known or suspected variations from the conditions described herein. If future development of the property indicated the presence of hazardous or toxic materials, ARDL, Inc. should be notified to perform a reevaluation of the environmental conditions.

The scope of this assessment did not include any additional environmental investigation, not outlined herein, or analysis for the presence or absence of hazardous or toxic materials in the soil, groundwater, surface water or air, in, on, under or above the subject tract.

The site assessment was performed in accordance with generally accepted practices of other consultants undertaking similar studies at the same time and in the same geographical area, and ARDL, Inc. observed that degree of care and skill generally exercised by other consultants under similar circumstances and conditions. The findings and conclusions stated herein must be considered not as scientific certainties, but rather as professional opinions concerning the significance of the limited data gathered during the course of the environmental site assessment. No other warranty, express or implied, is made.

Specifically, ARDL, Inc. does not and cannot represent that the site

contains no hazardous waste or material, oil (including petroleum products), or other latent condition beyond that observed by ARDL, Inc. during its site assessment.

The observations described in this report were made under the conditions stated therein. The conclusions presented in the report were based solely upon the services or the time and budgetary constraints imposed by the client. Furthermore, such conclusions are based solely on site condition, and rules and regulations in effect, at the time of study.

In preparing this report, ARDL, Inc. relied on certain information provided by state and local officials and other parties referenced therein, and on information contained in the files of state and/or local agencies available to ARDL, Inc. at the time of the site assessment. Although there may have been some degree of overlap in the information provided by these various sources, an attempt to independently verify the accuracy or completeness of all information reviewed or received during the course of this site assessment was not made.

Observations were made of the site and of structures on the site as indicated within the report. Where access to portions of the site or to structures on the site was unavailable or limited, ARDL, Inc. renders no opinion as to the presence of indirect evidence relating to hazardous waste or material or oil, or other petroleum products in that portion of the site or structure. In addition, ARDL, Inc. renders no opinion as to the presence of hazardous waste or material, oil or other petroleum products or to the presence of indirect evidence relating to hazardous material, oil, or petroleum products where direct observation of the interior walls, floor, roof, or ceiling of a structure on a site was obstructed by objects or coverings on or over these surfaces.

Unless otherwise specified in the report, ARDL, Inc. did not perform testing or analyses to determine the presence or concentration of asbestos, radon, formaldehyde, lead-based paint, lead in drinking water, electromagnetic fields (EMFs) or polychlorinated biphenyls (PCBs), at the site or in the environment at the site.

The purpose of this report was to assess the physical characteristics of the subject site with respect to the presence in the environment of hazardous waste or material, oil, or petroleum products. No specific attempt was made to check on the compliance of present or past owners or operators of the site with federal, state, or local laws and regulations, environmental or otherwise.

Appendix 1

Environmental Records Data, Topographical Maps

The EDR Area Study Report

Study Area
Schenimann Chute
Bainbridge, MO 63701

February 19, 2002

Inquiry number 736051.3s

Environmental Data Resources, Inc.

The Source For Environmental Risk Management Data

3530 Post Road
Southport, Connecticut 06490

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

EXECUTIVE SUMMARY

A search of available environmental records was conducted by Environmental Data Resources, Inc. (EDR).

TARGET PROPERTY INFORMATION

ADDRESS

SCHENIMANN CHUTE
BAINBRIDGE, MO 63701

DATABASES WITH NO MAPPED SITES

No mapped sites were found in EDR's search of available ("reasonably ascertainable ") government records within the requested search area for the following databases:

FEDERAL ASTM STANDARD

NPL	National Priority List
Proposed NPL	Proposed National Priority List Sites
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information System
CERC-NFRAP	CERCLIS No Further Remedial Action Planned
CORRACTS	Corrective Action Report
RCRIS-TSD	Resource Conservation and Recovery Information System
RCRIS-LQG	Resource Conservation and Recovery Information System
RCRIS-SQG	Resource Conservation and Recovery Information System
ERNS	Emergency Response Notification System

STATE ASTM STANDARD

SHWS	Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites
SWF/LF	Solid Waste Facility List
LUST	Leaking Underground Storage Tanks
UST	Petroleum Storage Tanks
VCP	Sites Participating in the Voluntary Cleanup Program

FEDERAL ASTM SUPPLEMENTAL

CONSENT	Superfund (CERCLA) Consent Decrees
ROD	Records Of Decision
Delisted NPL	National Priority List Deletions
FINDS	Facility Index System/Facility Identification Initiative Program Summary Report
HMIRS	Hazardous Materials Information Reporting System
MLTS	Material Licensing Tracking System
MINES	Mines Master Index File
NPL Liens	Federal Superfund Liens
PADS	PCB Activity Database System
RAATS	RCRA Administrative Action Tracking System
TRIS	Toxic Chemical Release Inventory System
TSCA	Toxic Substances Control Act
FTTS	FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)

STATE OR LOCAL ASTM SUPPLEMENTAL

AST	Aboveground Petroleum Storage Tanks

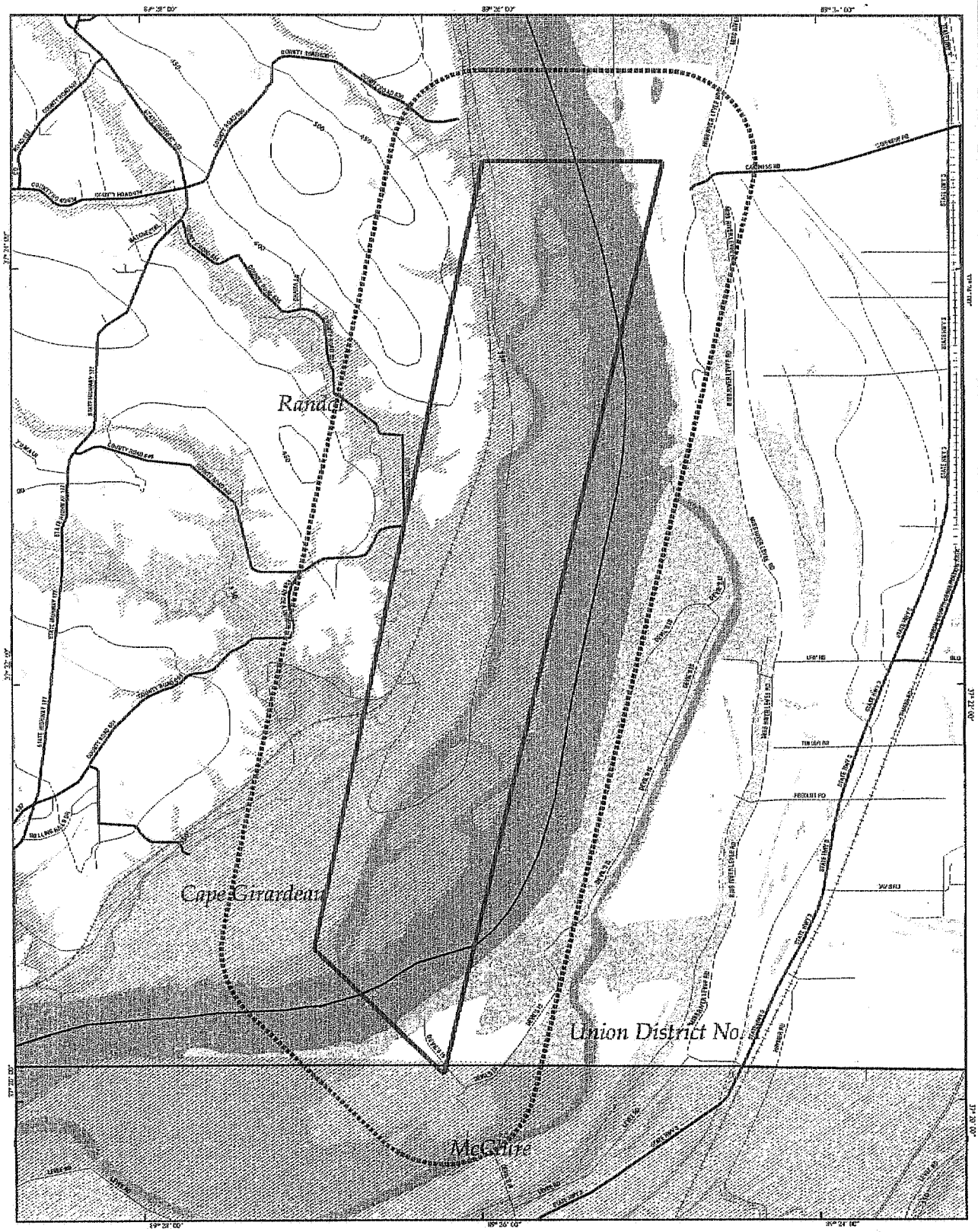
MO RRC..... Certified Hazardous Waste Resource Recovery Facilities

SURROUNDING SITES: SEARCH RESULTS

Surrounding sites were not identified.

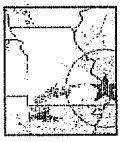
EXECUTIVE SUMMARY

Please refer to the end of the findings report for unmapped orphan sites due to poor or inadequate address information.



Environmental Data Resources, Inc.
1-800 352 0050

Study Area For
Schenimann Chute



Bainbridge, MO

Listed Sites
Earthquake Epicenters (Richter 5 or greater)
Search Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Pipelines
Powerlines
Fault Lines
Water
Superfund Sites
100-Yr Flood Zones
Wetlands

J-22

N

0 1/4 1/2

Scale in Miles

MAP FINDINGS SUMMARY

Database	Total Plotted
FEDERAL ASTM STANDARD	
NPL	0
Proposed NPL	0
CERCLIS	0
CERC-NFRAP	0
CORRACTS	0
RCRIS-TSD	0
RCRIS Lg. Quan. Gen.	0
RCRIS Sm. Quan. Gen.	0
ERNS	0
STATE ASTM STANDARD	
State Haz. Waste	0
State Landfill	0
LUST	0
UST	0
VCP	0
FEDERAL ASTM SUPPLEMENTAL	
CONSENT	0
ROD	0
Delisted NPL	0
FINDS	0
HMIRS	0
MLTS	0
MINES	0
NPL Liens	0
PADS	0
RAATS	0
TRIS	0
TSCA	0
FTTS	0
STATE OR LOCAL ASTM SUPPLEMENTAL	
AST	0
MO RRC	0

* Sites may be listed in more than one database

MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Site	Database(s)	EDR ID Number EPA ID Number

Coal Gas Site Search: EDR does not presently have coal gas site information available in this state.

NO SITES FOUND

ORPHAN SUMMARY

City	EDR ID	Site Name	Site Address	Zip	Database(s)	Facility ID
CAPE GIRARDEAU	U000749271	CAPE GIRARDEAU MAINT LOT	I-55 & RT AB	63701	UST	ST0012279
CAPE GIRARDEAU	U001162442	KFVS - TV	RT - V	63701	LUST, UST	ST0001039
CAPE GIRARDEAU	S104395959	TEXACO #7/EZ PUMP	I-55 / RT K	63701	LUST	ST5800635
CAPE GIRARDEAU	U001158638	NELL HOLCOMB SCHOOL DIST R-4	RT 1 BOX 144A	63701	UST	ST0000191
CAPE GIRARDEAU	1003877043	CAPE GIRARDEAU CITY LANDFILL	HWY 177 3/4 MI N OF	63701	CERC-NFRAP	
CAPE GIRARDEAU	A100135485	M & W PACKAGING US	14591 HWY 177	63701	AST	ST0008673
CAPE GIRARDEAU	U003831384	M & W PACKAGING US	14591 HWY 177	63701	UST	
CAPE GIRARDEAU	1000369458	FLORSHEIM SHOE CO	HWY 550 A-B	63701	RCRIS-SQG, FINDS	
CAPE GIRARDEAU	U000749276	CAPE SPECIAL ROAD DISTRICT	HWY 61 S	63701	UST	ST0011143
CAPE GIRARDEAU	1000439842	MARY CON CO INC	HWY 74 W 2 MI W	63701	RCRIS-SQG, FINDS, UST	ST0000208
CAPE GIRARDEAU	1000453507	H W I	SW CITY LIMIT ON RT AB	63701	FINDS, RCRIS-LQG	
CAPE GIRARDEAU	1000830437	GENERAL CLAY CO DBA GENERAL SIGN CO	4857 COUNTY RD 218	63701	RCRIS-SQG, FINDS	
CAPE GIRARDEAU	1000910699	BIOKYOWA INC	5469 COUNTY RD 218	63701	RCRIS-SQG, FINDS	
CAPE GIRARDEAU	S105060410	WASTEWATER TREATMENT SYSTEM	5469 COUNTY RD 218	63701	LUST	ST3901826
CAPE GIRARDEAU	1003876733	DDT SITE CAPE GIRARDEAU	SE MISSOURI STATE UNIVERSITY	63701	CERC-NFRAP	
CAPE GIRARDEAU	1000133304	EL FRINK TRUCK LINES	OLD HWY 61 S	63701	RCRIS-SQG, FINDS	
CAPE GIRARDEAU	U001158645	PUROLATER COURIER	OLD HWY 61 & NASH RD	63701	UST	ST0011305
FRUITLAND	1004059349	MODOT, I-55 REST AREA	HIGHWAY I-55	63701	FINDS	
JONESBORO	U003310628	C L CHOATE MENTAL HEALTH CENTER	ROUTE 1	62952	UST	7031757
JONESBORO	U003310127	JONESBORO HEALTH CARE CENTER	RT 127 S PO BOX B	62952	UST	7014289
JONESBORO	S104004710	ILLINOIS MENTAL HEALTH DEPT.	RT. 146 WEST	62952	LUST	
JONESBORO	U003310453	BITTLE LEONARD	RT 146 WEST	62952	UST	7023249
JONESBORO	U003310406	JONESBORO CENT SAVER	300 W BROAD ST HWY 146	62952	UST	7021733
JONESBORO	U003310460	UNION COUNTY MOTOR CO	613 E BROADWAY (HWY 146)	62952	UST	7023263
MCCLURE	1001123364	MANN AUTO BODY	RT ONE BOX 68	62957	RCRIS-SQG, FINDS	
RICHWOODS	U000752670	RICHWOODS R.S.	6 MI W OF RICHWOODS ON HWY T	63701	LUST, UST	ST0010279

J-25

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

To maintain currency of the following federal and state databases, EDR contacts the appropriate governmental agency on a monthly or quarterly basis, as required.

Elapsed ASTM days: Provides confirmation that this EDR report meets or exceeds the 90-day updating requirement of the ASTM standard.

FEDERAL ASTM STANDARD RECORDS

NPL: National Priority List
Source: EPA
Telephone: N/A
National Priorities List (Superfund). The NPL is a subset of CERCLIS and identifies over 1,200 sites for priority cleanup under the Superfund Program. NPL sites may encompass relatively large areas. As such, EDR provides polygon coverage for over 1,000 NPL site boundaries produced by EPA's Environmental Photographic Interpretation Center (EPIC) and regional EPA offices.

Date of Government Version: 10/22/01
Date Made Active at EDR: 12/11/01
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 11/05/01
Elapsed ASTM days: 36
Date of Last EDR Contact: 02/04/02

NPL Site Boundaries

Sources:

EPA's Environmental Photographic Interpretation Center (EPIC)
Telephone: 202-564-7333

EPA Region 1
Telephone 617-918-1143

EPA Region 3
Telephone 215-814-5418

EPA Region 4
Telephone 404-562-8033

EPA Region 6
Telephone: 214-655-6659

EPA Region 8
Telephone: 303-312-6774

Proposed NPL: Proposed National Priority List Sites
Source: EPA
Telephone: N/A

Date of Government Version: 10/22/01
Date Made Active at EDR: 12/11/01
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 11/05/01
Elapsed ASTM days: 36
Date of Last EDR Contact: 02/04/02

CERCLIS: Comprehensive Environmental Response, Compensation, and Liability Information System
Source: EPA
Telephone: 703-413-0223
CERCLIS contains data on potentially hazardous waste sites that have been reported to the USEPA by states, municipalities, private companies and private persons, pursuant to Section 103 of the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). CERCLIS contains sites which are either proposed to or on the National Priorities List (NPL) and sites which are in the screening and assessment phase for possible inclusion on the NPL.

Date of Government Version: 11/21/01
Date Made Active at EDR: 02/04/02
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 12/26/01
Elapsed ASTM days: 40
Date of Last EDR Contact: 12/26/01

CERCLIS-NFRAP: CERCLIS No Further Remedial Action Planned
Source: EPA
Telephone: 703-413-0223
As of February 1995, CERCLIS sites designated "No Further Remedial Action Planned" (NFRAP) have been removed from CERCLIS. NFRAP sites may be sites where, following an initial investigation, no contamination was found, contamination was removed quickly without the need for the site to be placed on the NPL, or the contamination was not serious enough to require Federal Superfund action or NPL consideration. EPA has removed approximately 25,000 NFRAP sites to lift the unintended barriers to the redevelopment of these properties and has archived them as historical records so EPA does not needlessly repeat the investigations in the future. This policy change is part of the EPA's Brownfields Redevelopment Program to help cities, states, private investors and affected citizens to promote economic redevelopment of unproductive urban sites.

Date of Government Version: 11/21/01
Date Made Active at EDR: 02/04/02
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 12/26/01
Elapsed ASTM days: 40
Date of Last EDR Contact: 12/16/01

CORRACTS: Corrective Action Report
Source: EPA
Telephone: 800-424-9346
CORRACTS identifies hazardous waste handlers with RCRA corrective action activity.

Date of Government Version: 11/14/01
Date Made Active at EDR: 01/14/02
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 11/14/01
Elapsed ASTM days: 61
Date of Last EDR Contact: 11/14/01

RCRIS: Resource Conservation and Recovery Information System
Source: EPA/NTIS
Telephone: 800-424-9346
Resource Conservation and Recovery Information System. RCRIS includes selective information on sites which generate, transport, store, treat and/or dispose of hazardous waste as defined by the Resource Conservation and Recovery Act (RCRA).

Date of Government Version: 06/21/00
Date Made Active at EDR: 07/31/00
Database Release Frequency: Varies

Date of Data Arrival at EDR: 07/10/00
Elapsed ASTM days: 21
Date of Last EDR Contact: 01/14/02

ERNS: Emergency Response Notification System
Source: EPA/NTIS
Telephone: 202-260-2342
Emergency Response Notification System. ERNS records and stores information on reported releases of oil and hazardous substances.

Date of Government Version: 08/08/00
Date Made Active at EDR: 09/06/00
Database Release Frequency: Varies

Date of Data Arrival at EDR: 08/11/00
Elapsed ASTM days: 26
Date of Last EDR Contact: 02/01/02

FEDERAL ASTM SUPPLEMENTAL RECORDS

BRS: Biennial Reporting System
Source: EPA/NTIS
Telephone: 800-424-9346
The Biennial Reporting System is a national system administered by the EPA that collects data on the generation and management of hazardous waste. BRS captures detailed data from two groups: Large Quantity Generators (LQG) and Treatment, Storage, and Disposal Facilities.

Date of Government Version: 12/31/99
Database Release Frequency: Biennially

Date of Last EDR Contact: 12/17/01
Date of Next Scheduled EDR Contact: 03/18/02

CONSENT: Superfund (CERCLA) Consent Decrees
Source: EPA Regional Offices
Telephone: Varies
Major legal settlements that establish responsibility and standards for cleanup at NPL (Superfund) sites. Released periodically by United States District Courts after settlement by parties to litigation matters.

Date of Government Version: N/A
Database Release Frequency: Varies

Date of Last EDR Contact: N/A
Date of Next Scheduled EDR Contact: N/A

ROD: Records Of Decision
Source: NTIS
Telephone: 703-416-0223
Record of Decision. ROD documents mandate a permanent remedy at an NPL (Superfund) site containing technical and health information to aid in the cleanup.

Date of Government Version: 09/30/00
Database Release Frequency: Annually

Date of Last EDR Contact: 01/07/02
Date of Next Scheduled EDR Contact: 04/08/02

DELISTED NPL: National Priority List Deletions
Source: EPA
Telephone: N/A
The National Oil and Hazardous Substances Pollution Contingency Plan (NCP) establishes the criteria that the EPA uses to delete sites from the NPL. In accordance with 40 CFR 300.425.(e), sites may be deleted from the NPL where no further response is appropriate.

Date of Government Version: 11/13/01
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 02/04/02
Date of Next Scheduled EDR Contact: 05/06/02

FINDS: Facility Index System/Facility Identification Initiative Program Summary Report
Source: EPA
Telephone: N/A
Facility Index System. FINDS contains both facility information and 'pointers' to other sources that contain more detail. EDR includes the following FINDS databases in this report: PCS (Permit Compliance System), AIRS (Aerometric Information Retrieval System), DOCKET (Enforcement Docket used to manage and track information on civil judicial enforcement cases for all environmental statutes), FURS (Federal Underground Injection Control), C-DOCKET (Criminal Docket System used to track criminal enforcement actions for all environmental statutes), FFIS (Federal Facilities Information System), STATE (State Environmental Laws and Statutes), and PADS (PCB Activity Data System).

Date of Government Version: 10/29/01
Database Release Frequency: Quarterly

Date of Last EDR Contact: 01/07/02
Date of Next Scheduled EDR Contact: 04/08/02

HMIRS: Hazardous Materials Information Reporting System
Source: U.S. Department of Transportation
Telephone: 202-366-4526
Hazardous Materials Incident Report System. HMIRS contains hazardous material spill incidents reported to DOT.

Date of Government Version: 05/31/01
Database Release Frequency: Annually

Date of Last EDR Contact: 01/21/02
Date of Next Scheduled EDR Contact: 04/22/02

MLTS: Material Licensing Tracking System
Source: Nuclear Regulatory Commission
Telephone: 301-415-7169
MLTS is maintained by the Nuclear Regulatory Commission and contains a list of approximately 8,100 sites which possess or use radioactive materials and which are subject to NRC licensing requirements. To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/25/01
Database Release Frequency: Quarterly

Date of Last EDR Contact: 01/07/02
Date of Next Scheduled EDR Contact: 04/08/02

MINES: Mines Master Index File
Source: Department of Labor, Mine Safety and Health Administration
Telephone: 303-231-5959

Date of Government Version: 12/14/01
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 01/02/02
Date of Next Scheduled EDR Contact: 04/01/02

NPL LIENS: Federal Superfund Liens
Source: EPA
Telephone: 205-564-4267
Federal Superfund Liens. Under the authority granted the USEPA by the Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) of 1980, the USEPA has the authority to file liens against real property in order to recover remedial action expenditures or when the property owner receives notification of potential liability. USEPA compiles a listing of filed notices of Superfund Liens.

Date of Government Version: 10/15/91
Database Release Frequency: No Update Planned

Date of Last EDR Contact: 11/19/01
Date of Next Scheduled EDR Contact: 02/18/02

PADS: PCB Activity Database System
Source: EPA
Telephone: 202-260-3936
PCB Activity Database. PADS Identifies generators, transporters, commercial storers and/or brokers and disposers of PCB's who are required to notify the EPA of such activities.

Date of Government Version: 09/30/01
Database Release Frequency: Annually

Date of Last EDR Contact: 11/13/01
Date of Next Scheduled EDR Contact: 02/12/02

RAATS: RCRA Administrative Action Tracking System
Source: EPA
Telephone: 202-564-4104
RCRA Administration Action Tracking System. RAATS contains records based on enforcement actions issued under RCRA pertaining to major violators and includes administrative and civil actions brought by the EPA. For administration actions after September 30, 1995, data entry in the RAATS database was discontinued. EPA will retain a copy of the database for historical records. It was necessary to terminate RAATS because a decrease in agency resources made it impossible to continue to update the information contained in the database.

Date of Government Version: 04/17/95
Database Release Frequency: No Update Planned

Date of Last EDR Contact: 12/11/01
Date of Next Scheduled EDR Contact: 03/11/02

TRIS: Toxic Chemical Release Inventory System
Source: EPA
Telephone: 202-260-1531
Toxic Release Inventory System. TRIS identifies facilities which release toxic chemicals to the air, water and land in reportable quantities under SARA Title III Section 313.

Date of Government Version: 12/31/99
Database Release Frequency: Annually

Date of Last EDR Contact: 12/26/01
Date of Next Scheduled EDR Contact: 03/25/02

TSCA: Toxic Substances Control Act
Source: EPA
Telephone: 202-260-5521
Toxic Substances Control Act. TSCA identifies manufacturers and importers of chemical substances included on the TSCA Chemical Substance Inventory list. It includes data on the production volume of these substances by plant site.

Date of Government Version: 12/31/98
Database Release Frequency: Every 4 Years

Date of Last EDR Contact: 01/22/02
Date of Next Scheduled EDR Contact: 04/22/02

FTTS: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA/Office of Prevention, Pesticides and Toxic Substances
Telephone: 202-564-2501
FTTS tracks administrative cases and pesticide enforcement actions and compliance activities related to FIFRA, TSCA and EPCRA (Emergency Planning and Community Right-to-Know Act). To maintain currency, EDR contacts the Agency on a quarterly basis.

Date of Government Version: 10/25/01
Database Release Frequency: Quarterly

Date of Last EDR Contact: 12/26/01
Date of Next Scheduled EDR Contact: 03/25/02

FTTS INSP: FIFRA/ TSCA Tracking System - FIFRA (Federal Insecticide, Fungicide, & Rodenticide Act)/TSCA (Toxic Substances Control Act)
Source: EPA
Telephone: 202-564-2501

Date of Government Version: 10/25/01
Database Release Frequency: Quarterly

Date of Last EDR Contact: 12/26/01
Date of Next Scheduled EDR Contact: 03/25/02

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

STATE OF MISSOURI ASTM STANDARD RECORDS

SHWS: Registry of Confirmed Abandoned or Uncontrolled Hazardous Waste Disposal Sites
Source: Department of Natural Resources
Telephone: 573-751-1990
State Hazardous Waste Sites. State hazardous waste site records are the states' equivalent to CERCLIS. These sites may or may not already be listed on the federal CERCLIS list. Priority sites planned for cleanup using state funds (state equivalent of Superfund) are identified along with sites where cleanup will be paid for by potentially responsible parties. Available information varies by state.

Date of Government Version: 12/31/01
Date Made Active at EDR: 01/21/02
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 01/07/02
Elapsed ASTM days: 14
Date of Last EDR Contact: 01/07/02

SWF/LF: Solid Waste Facility List
Source: Department of Natural Resources
Telephone: 573-751-5401
Solid Waste Facilities/Landfill Sites. SWF/LF type records typically contain an inventory of solid waste disposal facilities or landfills in a particular state. Depending on the state, these may be active or inactive facilities or open dumps that failed to meet RCRA Subtitle D Section 4004 criteria for solid waste landfills or disposal sites.

Date of Government Version: 01/02/02
Date Made Active at EDR: 02/06/02
Database Release Frequency: Quarterly

Date of Data Arrival at EDR: 01/22/02
Elapsed ASTM days: 15
Date of Last EDR Contact: 01/21/02

LUST: Leaking Underground Storage Tanks
Source: Department of Natural Resources
Telephone: 573-751-0135
Leaking Underground Storage Tank Incident Reports. LUST records contain an inventory of reported leaking underground storage tank incidents. Not all states maintain these records, and the information stored varies by state.

Date of Government Version: 01/02/02
Date Made Active at EDR: 02/01/02
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 01/14/02
Elapsed ASTM days: 18
Date of Last EDR Contact: 01/14/02

UST: Petroleum Storage Tanks
Source: Department of Natural Resources
Telephone: 573-751-0135
Registered Underground Storage Tanks. UST's are regulated under Subtitle I of the Resource Conservation and Recovery Act (RCRA) and must be registered with the state department responsible for administering the UST program. Available information varies by state program.

Date of Government Version: 01/02/02
Date Made Active at EDR: 02/01/02
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 01/21/02
Elapsed ASTM days: 11
Date of Last EDR Contact: 01/14/02

VCP: Sites Participating in the Voluntary Cleanup Program
Source: Department of Natural Resources
Telephone: 573-526-8913

Date of Government Version: 10/16/01
Date Made Active at EDR: 11/30/01
Database Release Frequency: Semi-Annually

Date of Data Arrival at EDR: 10/19/01
Elapsed ASTM days: 42
Date of Last EDR Contact: 01/15/02

STATE OF MISSOURI ASTM SUPPLEMENTAL RECORDS

AST: Aboveground Petroleum Storage Tanks
Source: Department of Natural Resources
Telephone: 573-751-3176
Registered Aboveground Storage Tanks.

GOVERNMENT RECORDS SEARCHED / DATA CURRENCY TRACKING

Date of Government Version: 08/23/01
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 01/24/02
Date of Next Scheduled EDR Contact: 04/15/02

RRC: Certified Hazardous Waste Resource Recovery Facilities
Source: Department of Natural Resources
Telephone: 573-751-3176

Date of Government Version: 12/19/01
Database Release Frequency: Semi-Annually

Date of Last EDR Contact: 12/18/01
Date of Next Scheduled EDR Contact: 03/18/02

EDR PROPRIETARY HISTORICAL DATABASES

Former Manufactured Gas (Coal Gas) Sites: The existence and location of Coal Gas sites is provided exclusively to EDR by Real Property Scan, Inc. ©Copyright 1993 Real Property Scan, Inc. For a technical description of the types of hazards which may be found at such sites, contact your EDR customer service representative.

Disclaimer Provided by Real Property Scan, Inc.

The information contained in this report has predominantly been obtained from publicly available sources produced by entities other than Real Property Scan. While reasonable steps have been taken to insure the accuracy of this report, Real Property Scan does not guarantee the accuracy of this report. Any liability on the part of Real Property Scan is strictly limited to a refund of the amount paid. No claim is made for the actual existence of toxins at any site. This report does not constitute a legal opinion.

OTHER DATABASE(S)

Depending on the geographic area covered by this report, the data provided in these specialty databases may or may not be complete. For example, the existence of wetlands information data in a specific report does not mean that all wetlands in the area covered by the report are included. Moreover, the absence of any reported wetlands information does not necessarily mean that wetlands do not exist in the area covered by the report.

Oil/Gas Pipelines/Electrical Transmission Lines: This data was obtained by EDR from the USGS in 1994. It is referred to by USGS as GeoData Digital Line Graphs from 1:100,000-Scale Maps. It was extracted from the transportation category including some oil, but primarily gas pipelines and electrical transmission lines.

Sensitive Receptors: There are individuals deemed sensitive receptors due to their fragile immune systems and special sensitivity to environmental discharges. These sensitive receptors typically include the elderly, the sick, and children. While the location of all sensitive receptors cannot be determined, EDR indicates those buildings and facilities - schools, daycares, hospitals, medical centers, and nursing homes - where individuals who are sensitive receptors are likely to be located.

Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 1999 from the U.S. Fish and Wildlife Service.

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR NEPACheck®

Schenimann Chute
Schenimann Chute
Bainbridge, MO 63701

Inquiry Number: 736051.1s

February 18, 2002

Environmental Data Resources, Inc.

The Source For Environmental Risk Management Data

3530 Post Road
Southport, Connecticut 06490

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com

TABLE OF CONTENTS

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

EDR NEPACheck® DESCRIPTION

The National Environmental Policy Act of 1969 (NEPA) requires that Federal agencies include in their decision-making processes appropriate and careful consideration of all environmental effects and actions, analyze potential environmental effects of proposed actions and their alternatives for public understanding and scrutiny, avoid or minimize adverse effects of proposed actions, and restore and enhance environmental quality as much as possible.

The EDR NEPACheck provides information which may be used, in conjunction with additional research, to determine whether a proposed site or action will have significant environmental effect.

The report provides maps and data for the following items (where available). Search results are provided in the Map Findings Summary on page 2 of this report.

	Regulation
Natural Areas Map	
• Federal Lands Data:	
- Officially designated wilderness areas	47 CFR 1.1307(1)
- Officially designated wildlife preserves, sanctuaries and refuges	47 CFR 1.1307(2)
- Wild and scenic rivers	40 CFR 6.302(e)
- Fish and Wildlife	40 CFR 6.302
• Threatened or Endangered Species, Fish and Wildlife, Critical Habitat Data (where available)	47 CFR 1.1307(3); 40 CFR 6.302
Historic Sites Map	
• National Register of Historic Places	47 CFR 1.1307(4); 40 CFR 6.302
• State Historic Places (where available)	
Flood Plain Map	
• National Flood Plain Data (where available)	47 CFR 1.1307(6); 40 CFR 6.302
Wetlands Map	
• National Wetlands Inventory Data (where available)	47 CFR 1.1307(7); 40 CFR 6.302
FCC & FAA Map	
• FCC antenna/tower sites, AM Radio Towers, FAA Markings and Obstructions, AM Radio Interference Zones, Airports, Topographic gradient	47 CFR 1.1307(8)

Key Contacts and Government Records Searched

MAP FINDINGS SUMMARY

The databases searched in this report are listed below. Database descriptions and other agency contact information is contained in the Key Contacts and Government Records Searched section on page 20 of this report.

Database	Search Distance (Miles)	Item within Search Distance	Item within 1/8 mile of Target Property
MO DNR Parks	1.00	NO	NO
US Federal Lands	1.00	NO	NO
IL Historic Sites	1.00	NO	NO
MO Historic Sites	1.00	NO	NO
National Register Hist. Places	1.00	NO	NO
FLOODPLAIN	1.00	YES	YES
NWI	1.00	YES	YES
FCC Cellular	1.00	NO	NO
FCC Antenna	1.00	NO	NO
FCC Tower	1.00	NO	NO
FCC AM Tower	1.00	NO	NO
FAA DOF	1.00	NO	NO

Natural Areas Map

0 1/4 1/2 1 Miles

N

★ Target Property
Roads
County Boundary
Waterways
Water
Locations
Federal Areas
Federal Linear Features
State Areas
State Linear Features

J-37

TARGET PROPERTY:	Schenimann Chute	CUSTOMER:	ARDL, Inc.
ADDRESS:	Schenimann Chute	CONTACT:	Amy Ruemmler
CITY/STATE/ZIP:	Bainbridge MO 63701	INQUIRY #:	736051.1s
LAT/LONG:	37.3740 / 89.4327	DATE:	February 18, 2002

NATURAL AREAS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	EDR ID Database

No mapped sites were found in EDR's search of available government records within the search radius around the target property.

Historic Sites Map

TARGET PROPERTY:	Schenimann Chute	CUSTOMER:	ARDL, Inc.
ADDRESS:	Schenimann Chute	CONTACT:	Amy Ruemmler
CITY/STATE/ZIP:	Bainbridge MO 63701	INQUIRY #:	736051.1s
LAT/LONG:	37.3740 / 89.4327	DATE:	February 18, 2002

HISTORIC SITES MAP FINDINGS

Map ID Direction Distance Distance (ft.)	EDR ID Database

No mapped sites were found in EDR's search of available government records within the search radius around the target property.

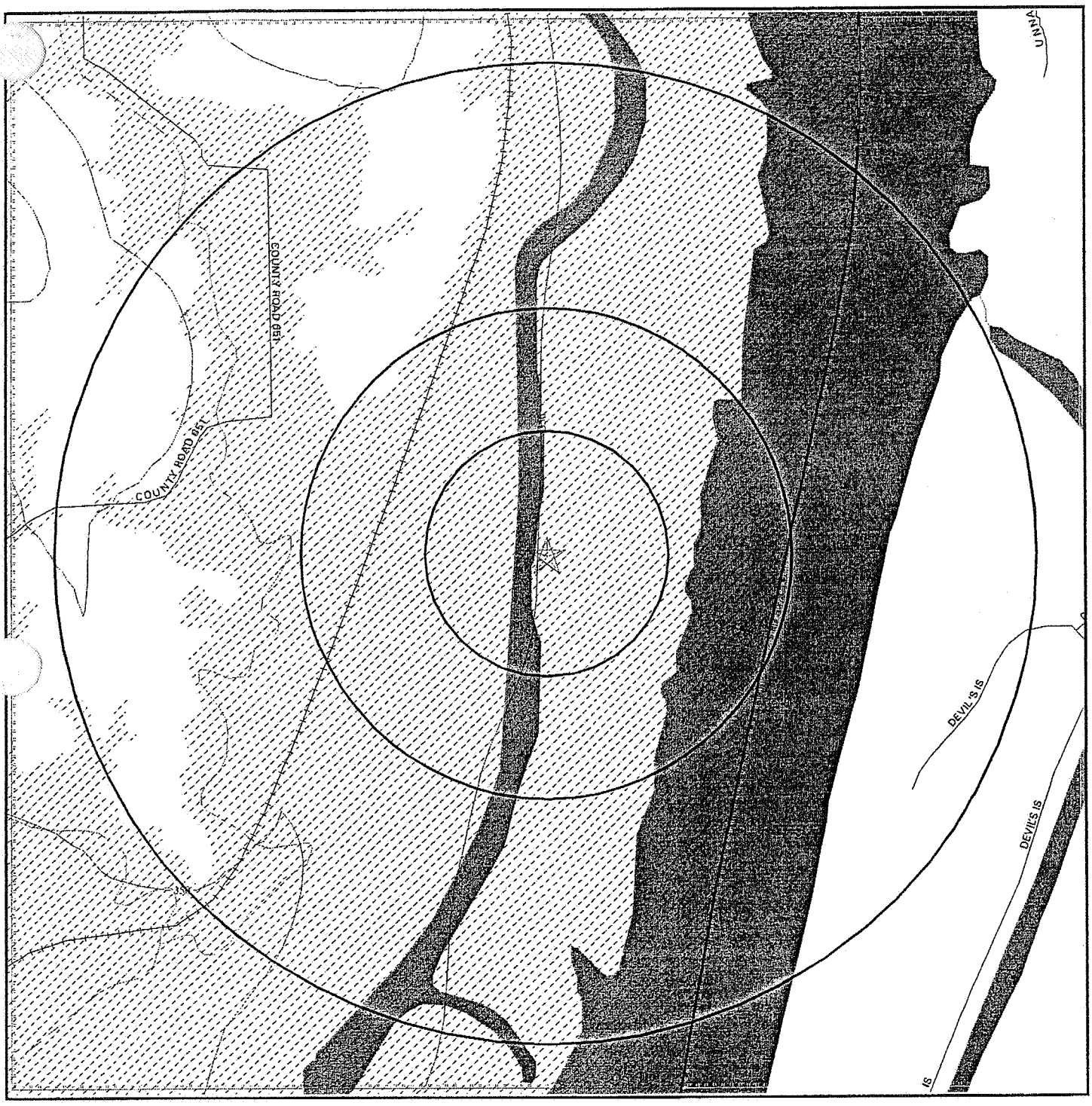
UNMAPPABLE HISTORIC SITES

Due to poor or inadequate address information, the following sites were not mapped:

	Status EDR ID Database

No unmapped sites were found in EDR's search of available government records.

Flood Plain Map



Major Roads
Contour Lines
Waterways
County Boundary
Power Lines
Pipe Lines
Fault Lines
Water
100-year flood zone
500-year flood zone
Electronic FEMA data available
Electronic FEMA data not available

0 1/4 1/2 1 Miles

N

J-42

TARGET PROPERTY:	Schenimann Chute	CUSTOMER:	ARDL, Inc.
ADDRESS:	Schenimann Chute	CONTACT:	Amy Ruemmler
CITY/STATE/ZIP:	Bainbridge MO 63701	INQUIRY #:	736051.1s
LAT/LONG:	37.3740 / 89.4327	DATE:	February 18, 2002

FLOOD PLAIN MAP FINDINGS

Source: FEMA Q3 Flood Data

County	FEMA flood data electronic coverage
CAPE GIRARDEAU, MO	YES
UNION, IL	NO
Flood Plain panel at target property:	2907900095C / CBPP
Additional Flood Plain panel(s) in search area:	None Reported

National Wetlands Inventory Map

Major Roads
Contour Lines
Waterways
County Boundary
Power Lines
Pipe Lines
Fault Lines
Water
Wetlands
Electronic NWI data available
Electronic NWI data not available

0 1/4 1/2 1 Miles

J-44

TARGET PROPERTY:	Schenimann Chute	CUSTOMER:	ARDL, Inc.
ADDRESS:	Schenimann Chute	CONTACT:	Amy Ruemmler
CITY/STATE/ZIP:	Bainbridge MO 63701	INQUIRY #:	736051.1s
LAT/LONG:	37.3740 / 89.4327	DATE:	February 18, 2002

WETLANDS MAP FINDINGS

Source: Fish and Wildlife Service NWI data

NWI hardcopy map at target property: McClure
Additional NWI hardcopy map(s) in search area:
Ware

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
1 North 0-1/8 mi 0	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
2 West 0-1/8 mi 42	R2UBH [R] Riverine, [2] Lower Perennial, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI
3 West 0-1/8 mi 331	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
4 SSW 1/8-1/4 mi 935	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
5 SSE 1/2-1 mi 3191	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
6 NW 1/2-1 mi 3348	PUBGH Description not reported	NWI
7 South 1/2-1 mi 3396	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
8 South 1/2-1 mi 3618	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
9 ESE 1/2-1 mi 3629	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI

*See Wetland Classification System for additional information.

WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
10 North 1/2-1 mi 3784	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
11 South 1/2-1 mi 3904	R2USC [R] Riverine, [2] Lower Perennial, [US] Unconsolidated Shore, [C] Seasonally Flooded	NWI
12 South 1/2-1 mi 4385	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
13 SE 1/2-1 mi 4737	PEMC [P] Palustrine, [EM] Emergent, [C] Seasonally Flooded	NWI
14 West 1/2-1 mi 4752	PUBGH Description not reported	NWI
15 ENE 1/2-1 mi 4758	R2USC [R] Riverine, [2] Lower Perennial, [US] Unconsolidated Shore, [C] Seasonally Flooded	NWI
16 ESE 1/2-1 mi 4832	PEMC [P] Palustrine, [EM] Emergent, [C] Seasonally Flooded	NWI
17 SE 1/2-1 mi 4852	PEMC [P] Palustrine, [EM] Emergent, [C] Seasonally Flooded	NWI
18 SSW 1/2-1 mi 4876	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI
19 ENE 1/2-1 mi 4892	R2USA [R] Riverine, [2] Lower Perennial, [US] Unconsolidated Shore, [A] Temporarily Flooded	NWI

*See Wetland Classification System for additional information.

WETLANDS MAP FINDINGS

Map ID Direction Distance Distance (ft.)	Code and Description*	Database
20 ENE 1/2-1 mi 5130	PEMC [P] Palustrine, [EM] Emergent, [C] Seasonally Flooded	NWI
21 ENE 1/2-1 mi 5188	R2UBH [R] Riverine, [2] Lower Perennial, [UB] Unconsolidated Bottom, [H] Permanently Flooded	NWI
22 SW 1/2-1 mi 5240	PFO1C [P] Palustrine, [FO] Forested, [1] Broad-Leaved Deciduous, [C] Seasonally Flooded	NWI

*See Wetland Classification System for additional information.

WETLANDS CLASSIFICATION SYSTEM

National Wetland Inventory Maps are produced by the U.S. Fish and Wildlife Service, a sub-department of the U.S. Department of the Interior. In 1974, the U.S. Fish and Wildlife Service developed a criteria for wetland classification with four long range objectives:

- to describe ecological units that have certain homogeneous natural attributes,
- to arrange these units in a system that will aid decisions about resource management,
- to furnish units for inventory and mapping, and
- to provide uniformity in concepts and terminology throughout the U.S.

High altitude infrared photographs, soil maps, topographic maps and site visits are the methods used to gather data for the productions of these maps. In the infrared photos, wetlands appear as different colors and these wetlands are then classified by type. Using a hierarchical classification, the maps identify wetland and deepwater habitats according to:

- system
- subsystem
- class
- subclass
- modifiers

(as defined by Cowardin, et al. U.S. Fish and Wildlife Service FWS/OBS 79/31. 1979.)

The classification system consists of five systems:

1. marine
2. estuarine
3. riverine
4. lacustrine
5. palustrine

The marine system consists of deep water tidal habitats and adjacent tidal wetlands. The riverine system consists of all wetlands contained within a channel. Thelacustrine systems includes all nontidal wetlands related to swamps, bogs & marshes. The estuarine system consists of deepwater tidal habitats and where ocean water is diluted by fresh water. The palustrine system includes nontidal wetlands dominated by trees and shrubs and where salinity is below .5% in tidal areas. All of these systems are divided in subsystems and then further divided into class.

National Wetland Inventory Maps are produced by transferring gathered data on a standard 7.5 minute U.S.G.S. topographic map. Approximately 52 square miles are covered on a National Wetland Inventory map at a scale of 1:24,000. Electronic data is compiled by digitizing these National Wetland Inventory Maps.

SYSTEM — **MARINE**

SUBSYSTEM — **1 - SUBTIDAL** | **2 - INTERTIDAL**

CLASS	Subclass (1 - SUBTIDAL)	Subclass (2 - INTERTIDAL)
RB-ROCK BOTTOM	1 Bedrock 2 Rubble	
UB-UNCONSOLIDATED BOTTOM	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	
AB-AQUATIC BED	1 Algal 3 Rooted Vascular 5 Unknown Submergent	1 Algal 3 Rooted Vascular 5 Unknown Submergent
RF-REEF	1 Coral 3 Worm	1 Coral 3 Worm
OW-OPEN WATER / Unknown Bottom		
RS-ROCKY SHORE		1 Bedrock 2 Rubble
US-UNCONSOLIDATED SHORE		1 Cobble-Gravel 2 Sand 3 Mud 4 Organic

SYSTEM — **E - ESTUARINE**

SUBSYSTEM — **1 - SUBTIDAL**

CLASS	Subclass
RB-ROCK BOTTOM	1 Bedrock 2 Rubble
UB-UNCONSOLIDATED BOTTOM	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic
AB-AQUATIC BED	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface
RF-REEF	2 Mollusk 3 Worm
OW-OPEN WATER / Unknown Bottom	

SUBSYSTEM — **2 - INTERTIDAL**

CLASS	Subclass
AB-AQUATIC BED	1 Algal 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface
RF-REEF	2 Mollusk 3 Worm
SB - STREAMBED	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic
RS-ROCKY SHORE	1 Bedrock 2 Rubble
US-UNCONSOLIDATED SHORE	1 Cobble- Gravel 2 Sand 3 Mud 4 Organic
EM-EMERGENT	1 Persistent 2 Nonpersistent
SS-SCRUB SHRUB	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen
FO-FORESTED	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen

SYSTEM — R - RIVERINE

SUBSYSTEM	1 - TIDAL	2 - LOWER PERENNIAL	3 - UPPER PERENNIAL	4 - INTERMITTENT	5 - UNKNOWN PERENNIAL
CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	*SB-STREAMBED	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	**EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Bedrock 2 Rubble 3 Cobble-Gravel 4 Sand 5 Mud 6 Organic 7 Vegetated	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

* STREAMBED is limited to TIDAL and INTERMITTENT SUBSYSTEMS, and comprises the only CLASS in the INTERMITTENT SUBSYSTEM.
**EMERGENT is limited to TIDAL and LOWER PERENNIAL SUBSYSTEMS.

SYSTEM — L - LACUSTRINE

SUBSYSTEM — 1 - LIMNETIC

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	

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SUBSYSTEM — 2 - LITTORAL

CLASS	RB-ROCK BOTTOM	UB-UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	RS-ROCKY SHORE	US-UNCONSOLIDATED SHORE	EM-EMERGENT	OW-OPEN WATER/ Unknown Bottom
Subclass	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Bedrock 2 Rubble	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	2 Nonpersistent	

SUBSYSTEM — **P - PALUSTRINE**

CLASS	RB--ROCK BOTTOM	UB--UNCONSOLIDATED BOTTOM	AB-AQUATIC BED	US--UNCONSOLIDATED SHORE	ML--MOSS-LICHEN	EM--EMERGENT	SS--SCRUB-SHRUB	FO--FORESTED	OW-OPEN WATER/ Unknown
Bottom									
Subclass	1 Bedrock 2 Rubble 3 Mud 4 Organic	1 Cobble-Gravel 2 Sand	1 Algal 2 Aquatic Moss 3 Rooted Vascular 4 Floating Vascular 5 Unknown Submergent 6 Unknown Surface	1 Cobble-Gravel 2 Sand 3 Mud 4 Organic 5 Vegetated	1 Moss 2 Lichen	1 Persistent 2 Nonpersistent	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6 Deciduous 7 Evergreen	1 Broad-Leaved Deciduous 2 Needle-Leaved Deciduous 3 Broad-Leaved Evergreen 4 Needle-Leaved Evergreen 5 Dead 6Deciduous 7 Evergreen	

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MODIFIERS

In order to more adequately describe wetland and deepwater habitats one or more of the water regime, water chemistry, soil, or special modifiers may be applied at the class or lower level in the hierarchy. The farmed modifier may also be applied to the ecological system.

WATER REGIME

Non-Tidal

- A Temporarily Flooded
- B Saturated
- C Seasonally Flooded
- D Seasonally Flooded/ Well Drained
- E Seasonally Flooded/ Saturated
- F Semipermanently Flooded
- G Intermittently Exposed

Tidal

- H Permanently Flooded
- J Intermittently Flooded
- K Artificially Flooded
- W Intermittently Flooded/Temporary
- Y Saturated/Semipermanent/ Seasonal
- Z Intermittently Exposed/Permanent
- U Unknown

CoastalHalinityInlandSalinitypHModifiersfor

- K Artificially Flooded
- L Subtidal
- M Irregularly Exposed
- N Regularly Flooded
- P Irregularly Flooded
- *S Temporary-Tidal
- *R Seasonal-Tidal
- *T Semipermanent -Tidal
- V Permanent -Tidal
- U Unknown

*These water regimes are only used in tidally influenced, freshwater systems.

WATER CHEMISTRY

- 1 Hyperhaline
- 2 Euhaline
- 3 Mixohaline (Brackish)
- 4 Polyhaline
- 5 Mesohaline
- 6 Oligohaline
- 0 Fresh
- 7 Hypersaline
- 8 Eusaline
- 9 Mixosaline
- 0 Fresh

all Fresh Water

- a Acid
- t Circumneutral
- i Alkaline

SOIL

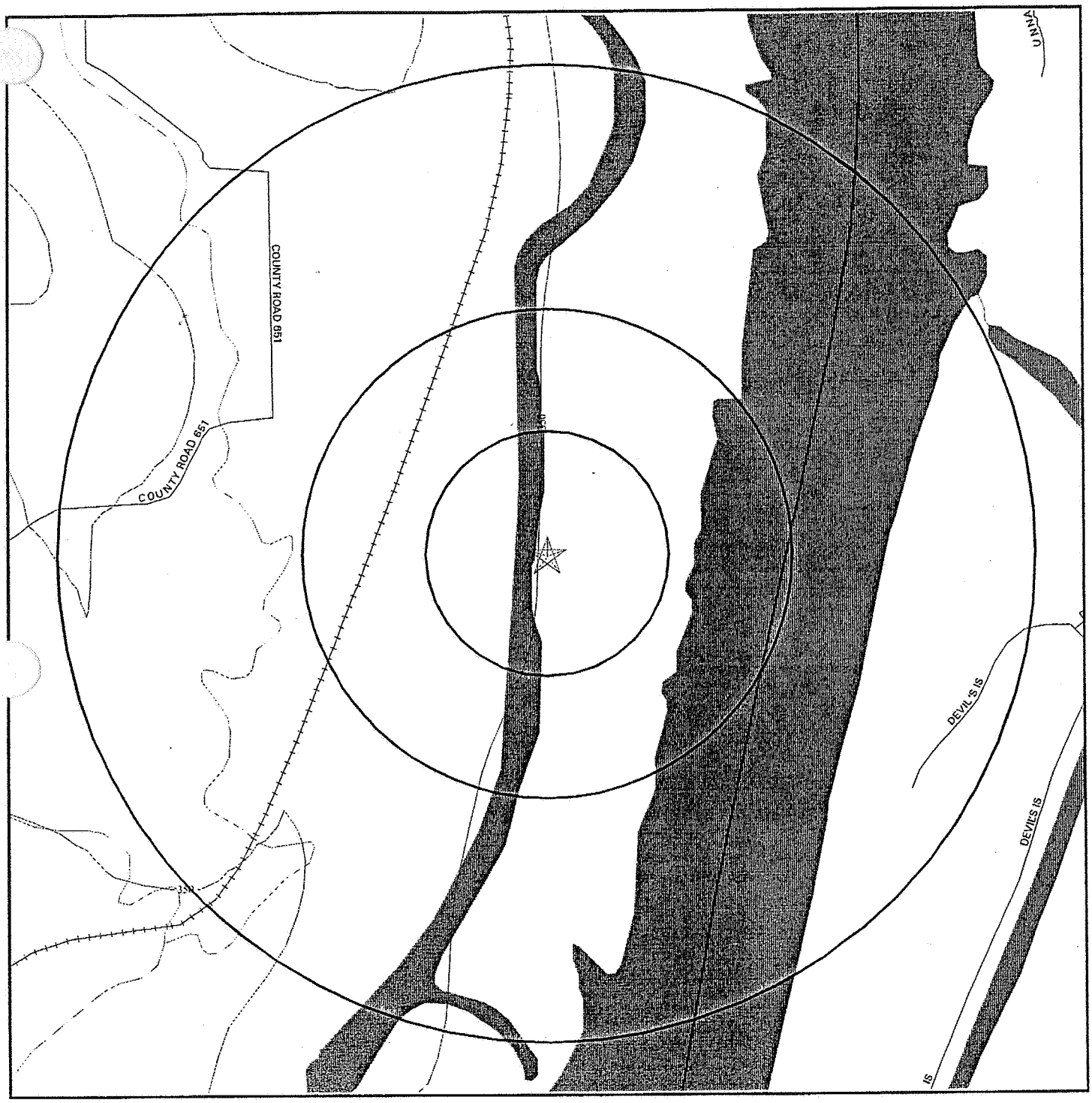
- g Organic
- n Mineral

SPECIAL MODIFIERS

- b Beaver
- d Partially Drained/Ditched
- f Farmed
- h Diked/Impounded
- r Artificial Substrate
- s Spoil
- x Excavated

Source: U.S. Department of the Interior
Fish and Wildlife Service
National Wetlands Inventory

FCC & FAA Sites Map



Streets
Contour Lines
County Boundary
Waterways
Water

Sites
Omni Directional AM Interference
Directional AM Interference

0 1/4 1/2 1 Miles

N

TARGET PROPERTY:	Schenimann Chute	J-52	CUSTOMER:	ARDL, Inc.	
ADDRESS:	Schenimann Chute		CONTACT:	Amy Ruemmler	
CITY/STATE/ZIP:	Bainbridge MO 63701		INQUIRY #:	736051.1s	
LAT/LONG:	37.3740 / 89.4327		DATE:	February 18, 2002	TC736051.1s Page 18 of 25

FCC & FAA SITES MAP FINDINGS

Map ID
Direction
Distance
Distance (ft.)

EDR ID
Database

No Sites Reported.

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Various Federal laws and executive orders address specific environmental concerns. NEPA requires the responsible offices to integrate to the greatest practical extent the applicable procedures required by these laws and executive orders. EDR provides key contacts at agencies charged with implementing these laws and executive orders to supplement the information contained in this report.

NATURAL AREAS
Officially designated wilderness areas
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service and Forest Service and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 09/01/1997

Federal Contacts for Additional Information

National Park Service, Midwest Region
1709 Jackson Street
Omaha, NE 68102
402-221-3471

USDA Forest Service, Eastern
310 West Wisconsin Avenue
Milwaukee, WI 53203
414-297-3693

BLM - Eastern States Office
7450 Boston Blvd.
Springfield, VA 22153
703-440-1713

Fish & Wildlife Service, Region 3
BHW Federal Building One Federal Drive
Fort Snelling, MN 55111-4056
612-713-5230

Officially designated wildlife preserves, sanctuaries and refuges
Government Records Searched in This Report

FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service and Forest Service and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 09/01/1997

IL Natural Areas: Natural Areas
Source: Department of Natural Resources.
Telephone: 217-785-8586

IL Nature Preserve: Nature Preserves
A nature preserve is an area of land or water in public or private ownership that is formally dedicateed pursuant to the terms of the law, to be maintained in its natural condition.
Source: Department of Natural Resources.
Telephone: 217-785-8586

IL State Conservation Area: State Conservation Areas
Conservation areas in Illinois
Source: Department of Natural Resources.
Telephone: 217-785-8586

IL Fish and Wildlife: State Fish and Wildlife Areas
Source: Department of Natural Resources.
Telephone: 217-785-8586

MO DNR Parks: DNR Parks
Dept. of Natural Resources owned lands in Missouri
Source: Missouri Spatial Data Information Service.
Telephone: 573-884-7802

Federal Contacts for Additional Information
Fish & Wildlife Service, Region 3
BHW Federal Building One Federal Drive
Fort Snelling, MN 55111-4056
612-713-5230

State Contacts for Additional Information
Dept. of Conservation 573-751-4115

Wild and scenic rivers
Government Records Searched in This Report
FED_LAND: Federal Lands
Source: USGS
Telephone: 703-648-5094
Federal data from Bureau of Land Management, National Park Service and Forest Service and Fish and Wildlife Service.
- National Parks
- Forests
- Monuments
- Wildlife Sanctuaries, Preserves, Refuges
- Federal Wilderness Areas.

Date of Government Version: 09/01/1997

Federal Contacts for Additional Information
Fish & Wildlife Service, Region 3
BHW Federal Building One Federal Drive
Fort Snelling, MN 55111-4056
612-713-5230

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Endangered Species

Federal Contacts for Additional Information
Fish & Wildlife Service, Region 3
BHW Federal Building One Federal Drive
Fort Snelling, MN 55111-4056
612-713-5230

State Contacts for Additional Information
Natural Heritage Database, Dept. of Conservation 573-751-4115

LANDMARKS, HISTORICAL, AND ARCHEOLOGICAL SITES
Historic Places
Government Records Searched in This Report
National Register of Historic Places:
The National Register of Historic Places is the official federal list of districts, sites, buildings, structures, and objects significant in American history, architecture, archeology, engineering, and culture. These contribute to an understanding of the historical and cultural foundations of the nation.
The National Register includes:
- All prehistoric and historic units of the National Park System;
- National Historic Landmarks, which are properties recognized by the Secretary of the Interior as possessing national significance; and
- Properties significant in American, state, or local prehistory and history that have been nominated by State Historic Preservation Officers, federal agencies, and others, and have been approved for listing by the National Park Service.

Date of Government Version: 03/15/2000

IL Historic Sites: State Historic Sites
Listing of historic sites included on the State Register.
Source: Illinois Historic Preservation Agency.
Telephone: 217-785-1511

IL Historic Sites: National Register of Historic Places
Listing of historic sites included on the National Register of Historic Places for Illinois
Source: IL Historic Preservation Agency.
Telephone: 217-785-1511

MO Historic Sites: Missouri Properties Listed in the National Register of Historic Properties
Listing of historic sites included on the National Register for Missouri.
Source: Department of Natural Resources.
Telephone: 573-751-7858

Federal Contacts for Additional Information
Park Service; Advisory Council on Historic Preservation
1849 C Street NW
Washington, DC 20240
Phone: (202) 208-6843

State Contacts for Additional Information
Illinois Historic Preservation Agency 217-785-1153
State Dept. of Natural Resources 573-751-4422

Indian Religious Sites
Federal Contacts for Additional Information
Department of the Interior- Bureau of Indian Affairs
Office of Public Affairs
1849 C Street, NW
Washington, DC 20240-0001
Office: 202-208-3711
Fax: 202-501-1516

National Association of Tribal Historic Preservation Officers
1411 K Street NW, Suite 700
Washington, DC 20005
Phone: 202-628-8476
Fax: 202-628-2241

State Contacts for Additional Information
A listing of local Tribal Leaders and Bureau of Indian Affairs Representatives can be found at:
http://www.doi.gov/bia/areas/agency.html

FLOOD PLAIN, WETLANDS AND COASTAL ZONE

Flood Plain Management
Government Records Searched in This Report
Flood Zone Data: This data, available in select counties across the country, was obtained by EDR in 1999 from the Federal Emergency Management Agency (FEMA). Data depicts 100-year and 500-year flood zones as defined by FEMA.

Federal Contacts for Additional Information
Federal Emergency Management Agency 877-3362-627

State Contacts for Additional Information
Missouri State Emergency Management Agency 573-526-9109

Wetlands Protection
Government Records Searched in This Report
NWI: National Wetlands Inventory. This data, available in select counties across the country, was obtained by EDR in 1999 from the U.S. Fish and Wildlife Service.

Federal Contacts for Additional Information
Fish & Wildlife Service 813-570-5412

State Contacts for Additional Information
Dept. of Conservation 573-751-4115

KEY CONTACTS & GOVERNMENT RECORDS SEARCHED

Coastal Zone Management
Government Records Searched in This Report
CAMA Management Areas
Dept. of Env., Health & Natural Resources
919-733-2293

Federal Contacts for Additional Information
Office of Ocean and Coastal Resource Management
N/ORM, SSMC4
1305 East-West Highway
Silver Spring, Maryland 20910
301-713-3102

State Contacts for Additional Information

FCC & FAA SITES MAP
For NEPA actions that come under the authority of the FCC, the FCC requires evaluation of Antenna towers and/or supporting structures that are to be equipped with high intensity white lights which are to be located in residential neighborhoods, as defined by the applicable zoning law.

Government Records Searched in This Report
Cellular
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

Tower
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

Antenna Registration
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

AM Tower
Federal Communications Commission
Mass Media Bureau
2nd Floor - 445 12th Street SW
Washington DC 20554 USA
Telephone (202) 418-2700

FAA Digital Obstacle File
National Oceanic and Atmospheric Administration
Telephone: 301-436-8301
Describes known obstacles of interest to aviation users in the US. Used by the Federal Aviation Administration (FAA) and the National Oceanic and Atmospheric Administration to manage the National Airspace System.

OTHER CONTACT SOURCES

NEPA Single Point of Contact
State Contacts for Additional Information
Federal Assistance Clearinghouse
Office of Administration
P.O. Box 809
Jefferson Building, Room 915
Jefferson City, MO 65102
573-751-4834

Excessive Radio Frequency Emission
For NEPA actions that come under the authority of the FCC, Commission actions granting construction permits, licenses to transmit or renewals thereof, equipment authorizations or modifications in existing facilities, require the determination of whether the particular facility, operation or transmitter would cause human exposure to levels of radio frequency in excess of certain limits.

Federal Contacts for Additional Information
Office of Engineering and Technology
Federal Communications Commission
445 12th Street SW
Washington, DC 20554
Phone: 202-418-2470

The EDR Well Search Report
EDR Area Study

Well Search
Schenimann Chute
Bainbridge, MO 63701

February 19, 2002

Inquiry number 736051.3w

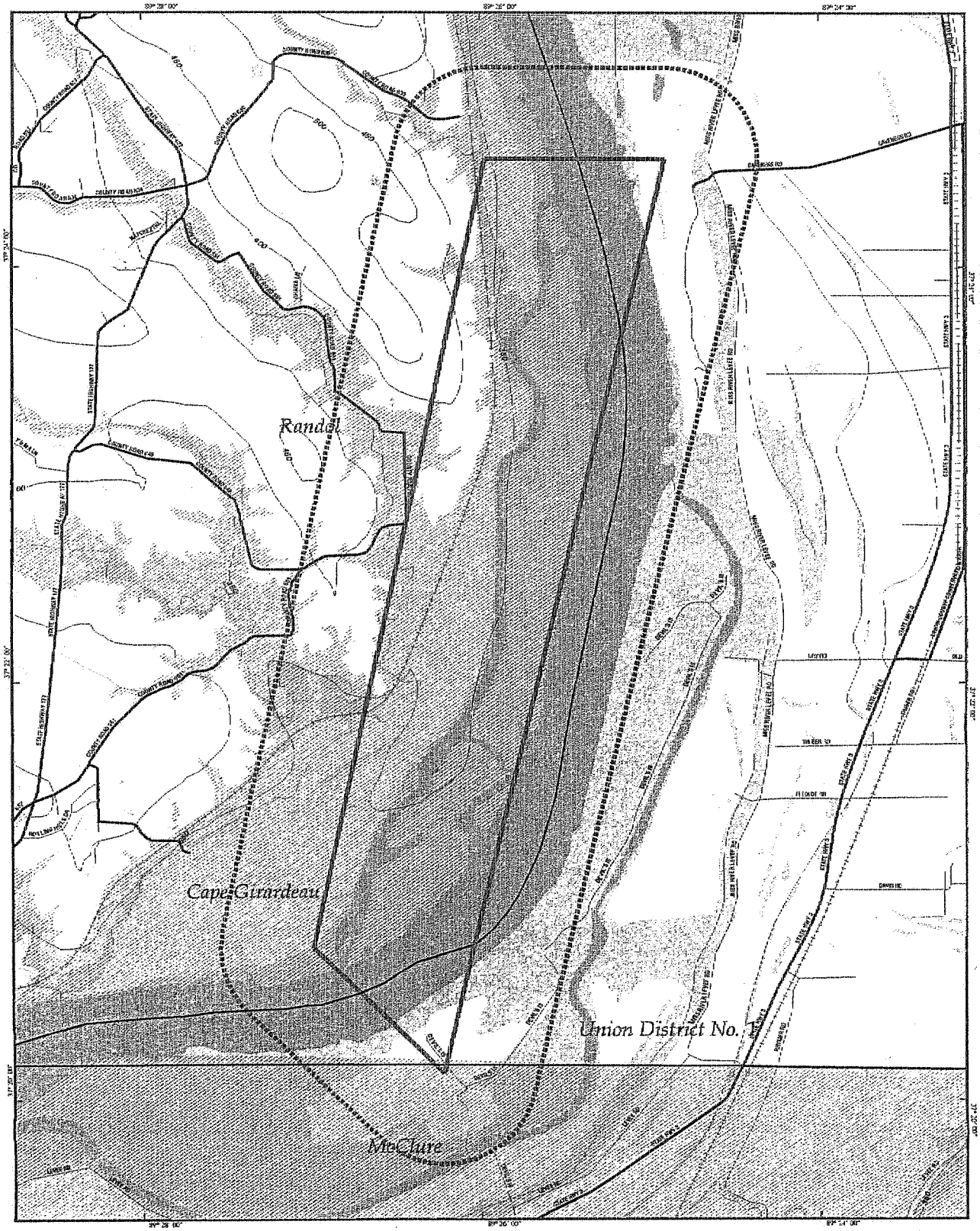
Environmental Data Resources, Inc.

The Source
For Environmental
Risk Management
Data

3530 Post Road
Southport, Connecticut 06490

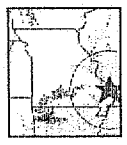
Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802
Internet: www.edrnet.com



Environmental Data Resources, Inc.
1-800-352-0050

Well Search For
Schenimann Chute



Bainbridge, MO

Listed Water Wells
Study Boundary
Roads
Major Roads
Waterways
Railroads
Contour Lines
Fault Lines
Water
Superfund Sites
100-Yr Flood Zones
Wetlands

J-61

N

0 1/4 1/2

Scale in Miles

GEOCHECK VERSION 2.1
SUMMARY

FEDERAL DATABASE WELL INFORMATION

MAP ID	WELL ID

NO WELLS FOUND

STATE WATER WELL INFORMATION

MAP ID	WELL ID

NO WELLS FOUND

PUBLIC WATER SUPPLY SYSTEM INFORMATION

NO WELLS FOUND

USGS TOPOGRAPHIC MAP(S)

2437089-C4 MCCLURE, IL MO
2437089-D4 WARE, IL MO

AREA RADON INFORMATION

Zip Code: 62952

Number of sites tested: 1

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.400 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	0.900 pCi/L	100%	0%	0%

Zip Code: 63701

Number of sites tested: 4

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.900 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	4.225 pCi/L	75%	25%	0%

EPA Radon Zone for CAPE GIRARDEAU County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

CAPE GIRARDEAU COUNTY, MO

Number of sites tested: 8

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.500 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	3.550 pCi/L	75%	25%	0%

GEOCHECK VERSION 2.1
SUMMARY

AREA RADON INFORMATION

EPA Radon Zone for UNION County: 2

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

UNION COUNTY, IL

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	1.200 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	1.000 pCi/L	100%	0%	0%

EPA Radon Zone for ALEXANDER County: 3

Note: Zone 1 indoor average level > 4 pCi/L.
: Zone 2 indoor average level >= 2 pCi/L and <= 4 pCi/L.
: Zone 3 indoor average level < 2 pCi/L.

ALEXANDER COUNTY, IL

Number of sites tested: 6

Area	Average Activity	% <4 pCi/L	% 4-20 pCi/L	% >20 pCi/L
Living Area - 1st Floor	0.800 pCi/L	100%	0%	0%
Living Area - 2nd Floor	Not Reported	Not Reported	Not Reported	Not Reported
Basement	0.850 pCi/L	100%	0%	0%

MISSOURI GOVERNMENT WELL RECORDS SEARCHED

PWS: Public Water Systems
Source: EPA/Office of Drinking Water
Telephone: 202-260-2805
Public Water System data from the Federal Reporting Data System. A PWS is any water system which provides water to at least 25 people for at least 60 days annually. PWSs provide water from wells, rivers and other sources.

PWS ENF: Public Water Systems Violation and Enforcement Data
Source: EPA/Office of Drinking Water
Telephone: 202-260-2805
Violation and Enforcement data for Public Water Systems from the Safe Drinking Water Information System (SDWIS) after August 1995. Prior to August 1995, the data came from the Federal Reporting Data System (FRDS).

Area Radon Information: The National Radon Database has been developed by the U.S. Environmental Protection Agency (USEPA) and is a compilation of the EPA/State Residential Radon Survey and the National Residential Radon Survey. The study covers the years 1986 - 1992. Where necessary data has been supplemented by information collected at private sources such as universities and research institutions.

EPA Radon Zones: Sections 307 & 309 of IRAA directed EPA to list and identify areas of U.S. with the potential for elevated indoor radon levels.

USGS Water Wells: In November 1971 the United States Geological Survey (USGS) implemented a national water resource information tracking system. This database contains descriptive information on sites where the USGS collects or has collected data on surface water and/or groundwater. The groundwater data includes information on more than 900,000 wells, springs, and other sources of groundwater.

Missouri Public Drinking Water Wells
Source: Department of Natural Resources
Telephone: 573-526-5448

Thank you for your business.
Please contact EDR at 1-800-352-0050
with any questions or comments.

The EDR-Historical Topographic Map Report

Schenmann Chute
Schenmann Chute
Bainbridge, MO 63701

February 20, 2002

Inquiry Number: 736051-2

Environmental Data Resources, Inc.
an edr company

The Source For Environmental Risk Management Data

3530 Post Road
Southport, Connecticut 06490

Nationwide Customer Service

Telephone: 1-800-352-0050
Fax: 1-800-231-6802

Environmental Data Resources, Inc.
Historical Topographic Map Report

Environmental Data Resources, Inc.'s (EDR) Historical Topographic Map Report is designed to assist professionals in evaluating potential liability on a target property, and its surrounding area, resulting from past activities. ASTM E 1527-00, Section 7.3 on Historical Use Information, identifies the prior use requirements for a Phase I environmental site assessment. The ASTM standard requires a review of *reasonably ascertainable standard historical sources. Reasonably ascertainable is defined as information that is publicly available, obtainable from a source with reasonable time and cost constraints, and practically reviewable.*

To meet the prior use requirements of ASTM E 1527-00, Section 7.3.2, the following *standard historical sources* may be used: aerial photographs, city directories, fire insurance maps, topographic maps, property tax files, land title records (although these cannot be the sole historical source consulted), building department records, or zoning/and use records. ASTM E 1527-00 requires *"All obvious uses of the property shall be identified from the present, back to the property's obvious first developed use, or back to 1940, whichever is earlier. This task requires reviewing only as many of the standard historical sources as are necessary, and that are reasonably ascertainable and likely to be useful."* (ASTM E 1527-00, Section 7.3.2 page 11.)

EDR's Historical Topographic Map Report includes a search of available public and private color historical topographic map collections.

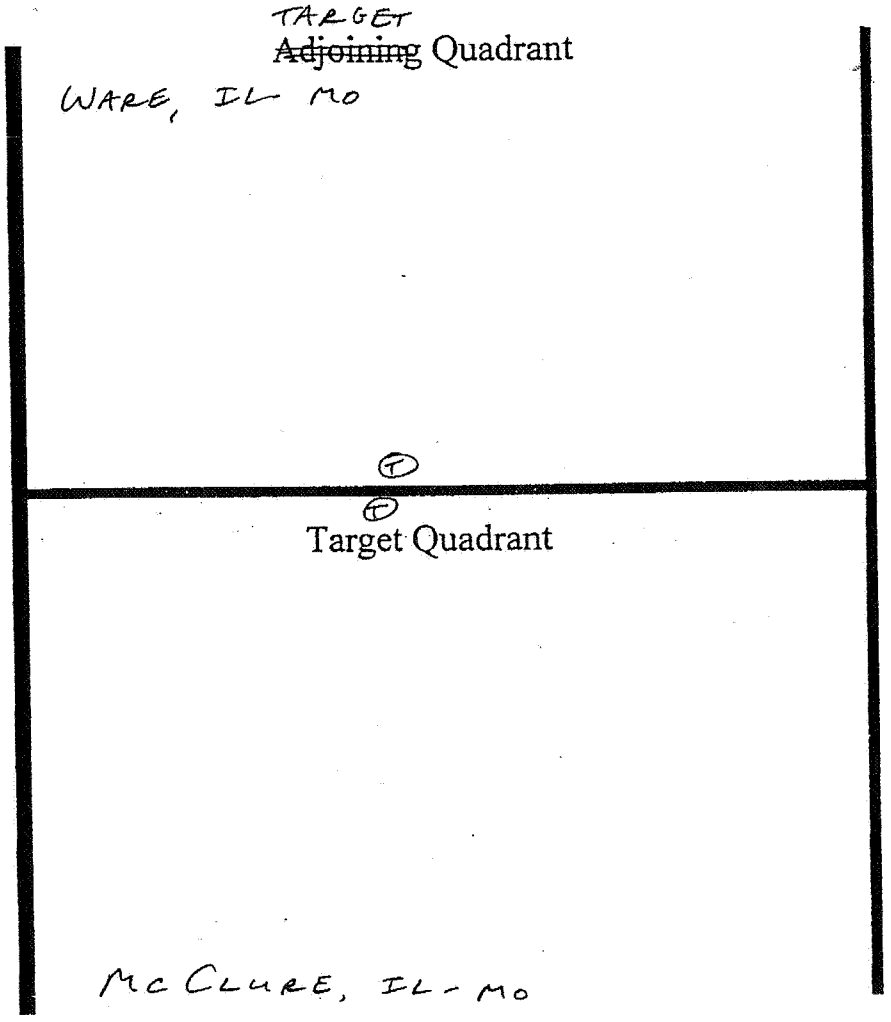
Topographic Maps
A topographic map (topo) is a color coded line-and-symbol representation of natural and selected artificial features plotted to a scale. Topos show the shape, elevation, and development of the terrain in precise detail by using contour lines and color coded symbols. Many features are shown by lines that may be straight, curved, solid, dashed, dotted, or in any combination. The colors of the lines usually indicate similar classes of information. For example, topographic contours (brown); lakes, streams, irrigation ditches, etc. (blue); land grids and important roads (red); secondary roads and trails, railroads, boundaries, etc. (black); and features that have been updated using aerial photography, but not field verified, such as disturbed land areas (e.g., gravel pits) and newly developed water bodies (purple).

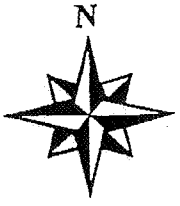
For more than a century, the USGS has been creating and revising topographic maps for the entire country at a variety of scales. There are about 60,000 U.S. Geological Survey (USGS) produced topo maps covering the United States. Each map covers a specific quadrangle (quad) defined as a four-sided area bounded by latitude and longitude. Historical topographic maps are a valuable historical resource for documenting the prior use of a property and its surrounding area, and due to their frequent availability can be particularly helpful when other standard historical sources (such as city directories, fire insurance maps, or aerial photographs) are not reasonably ascertainable.

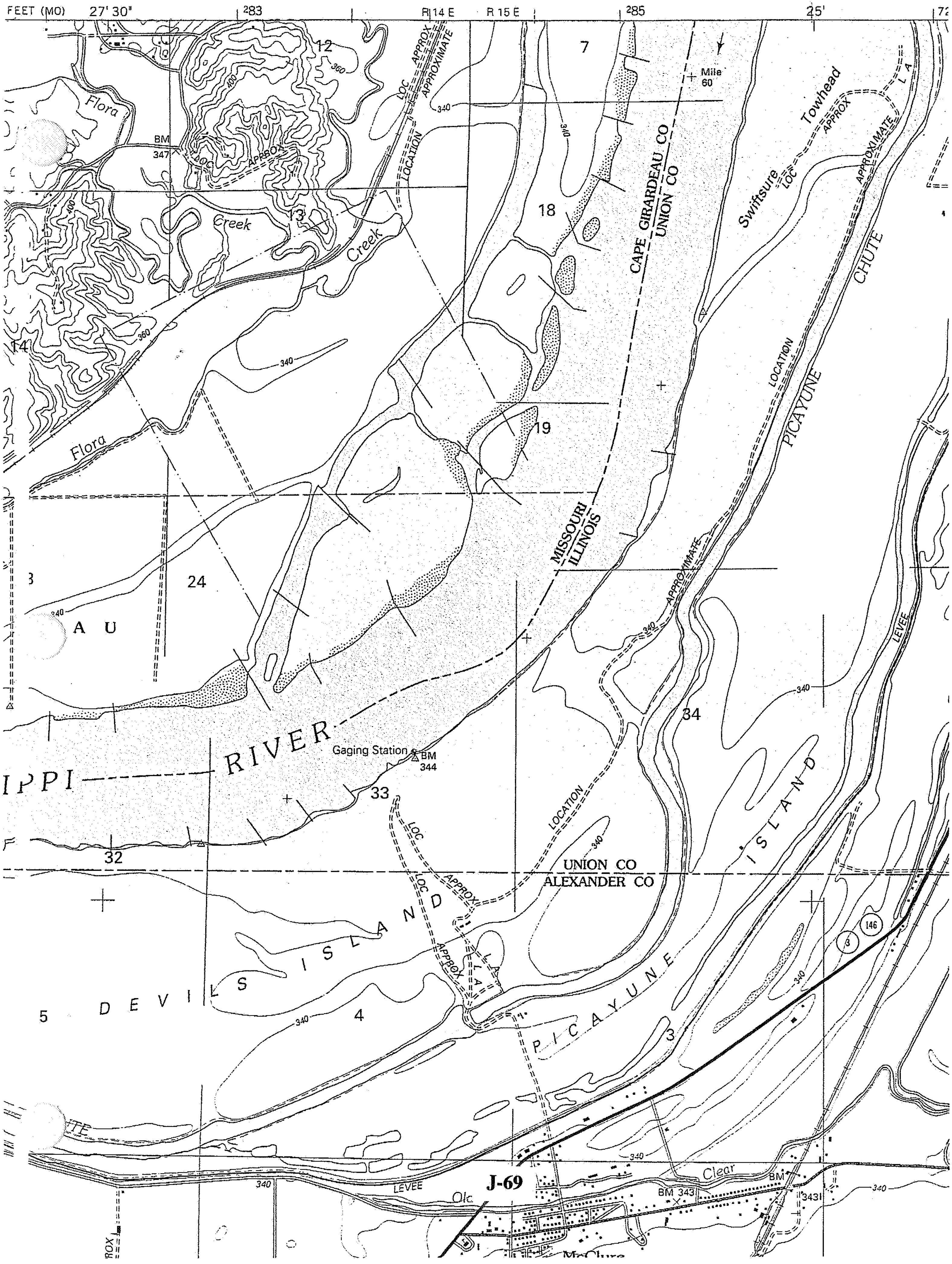
Quadrangle Relation Chart

7.5 minute series
Scale = 1: 24,000

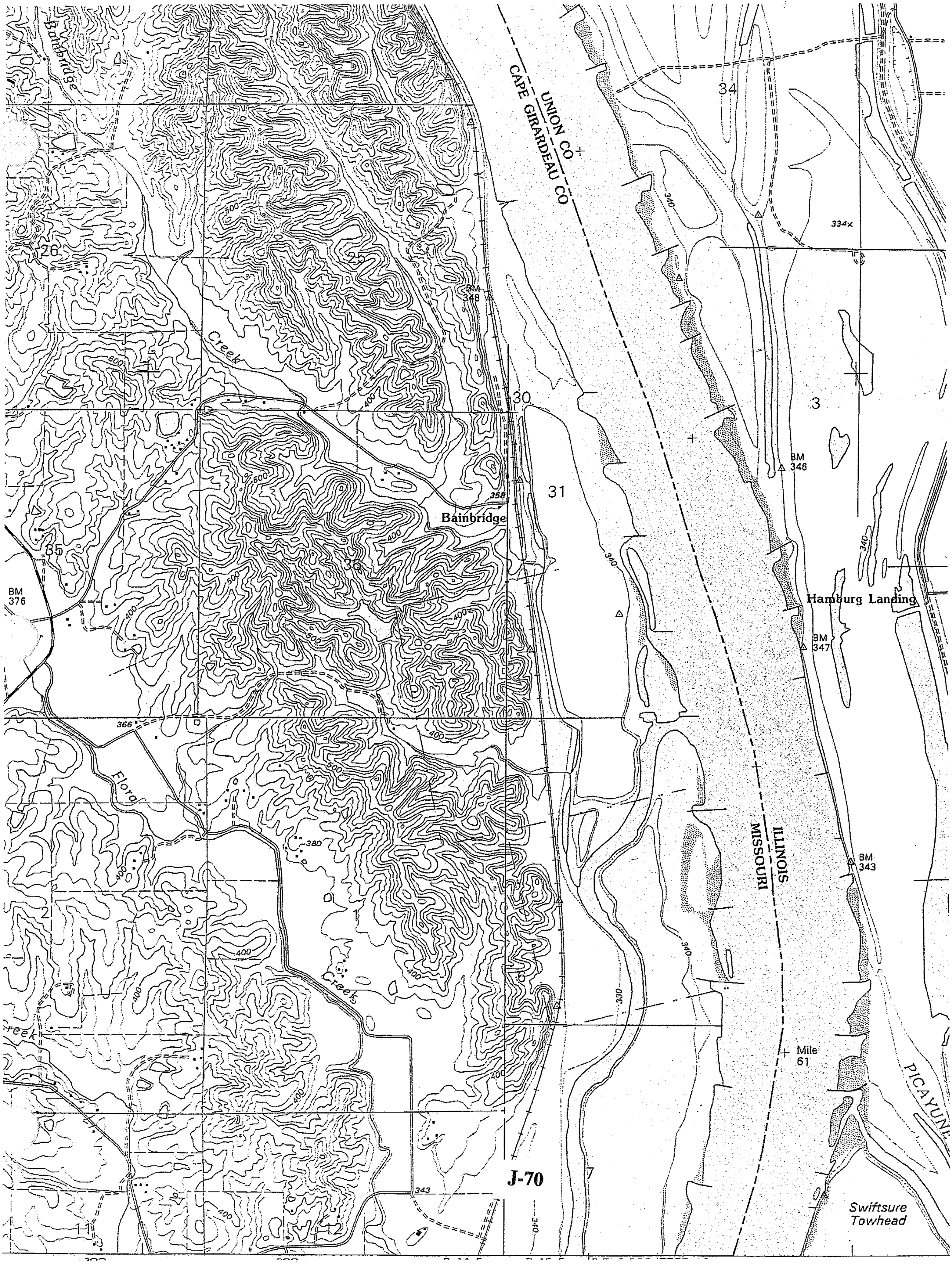
Inquiry # 736051-2







FEET (MO)
27' 30"
283
R 14 E
R 15 E
285
25'
Mile 60
Flora
Creek
Flora
Creek
Creek
Swiftsure Towhead
PICAYUNE CHUTE
CAPE GIRARDEAU CO
UNION CO
MISSOURI
ILLINOIS
IPPI RIVER
Gaging Station
BM 344
BM 347
UNION CO
ALEXANDER CO
DEVILS ISLAND
PICAYUNE ISLAND
LEVEE
Clear
J-69
BM 343
McClure


UNION CO
CAPE GIRARDEAU CO
Bainbridge
Creek
Bainbridge
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Creek
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ILLINOIS
MISSOURI
Hamburg Landing
PICAYUNE
Swiftsure
Towhead
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BM 376
BM 346
BM 347
BM 343
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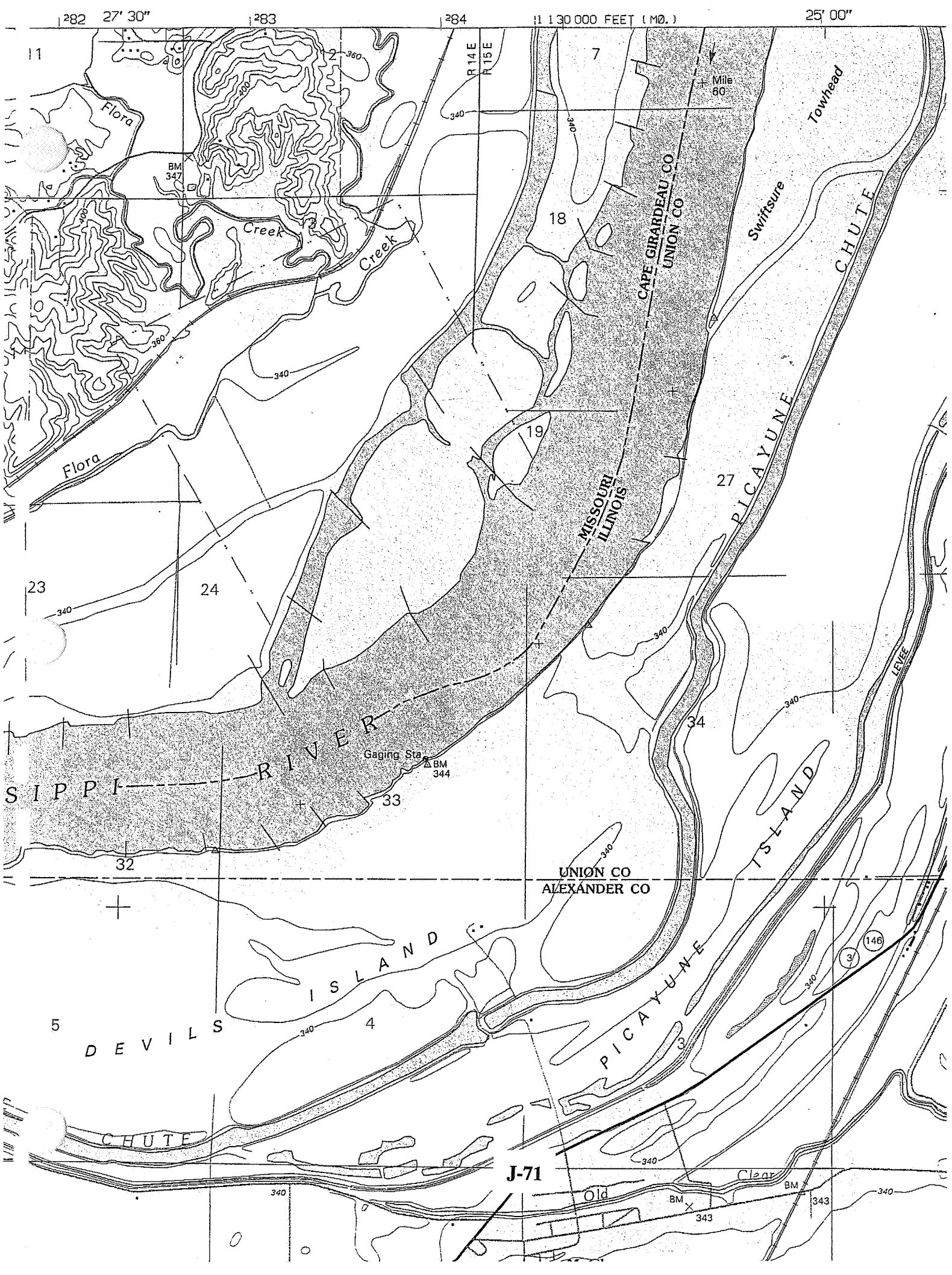
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BM 344
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RIVER
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UNION CO
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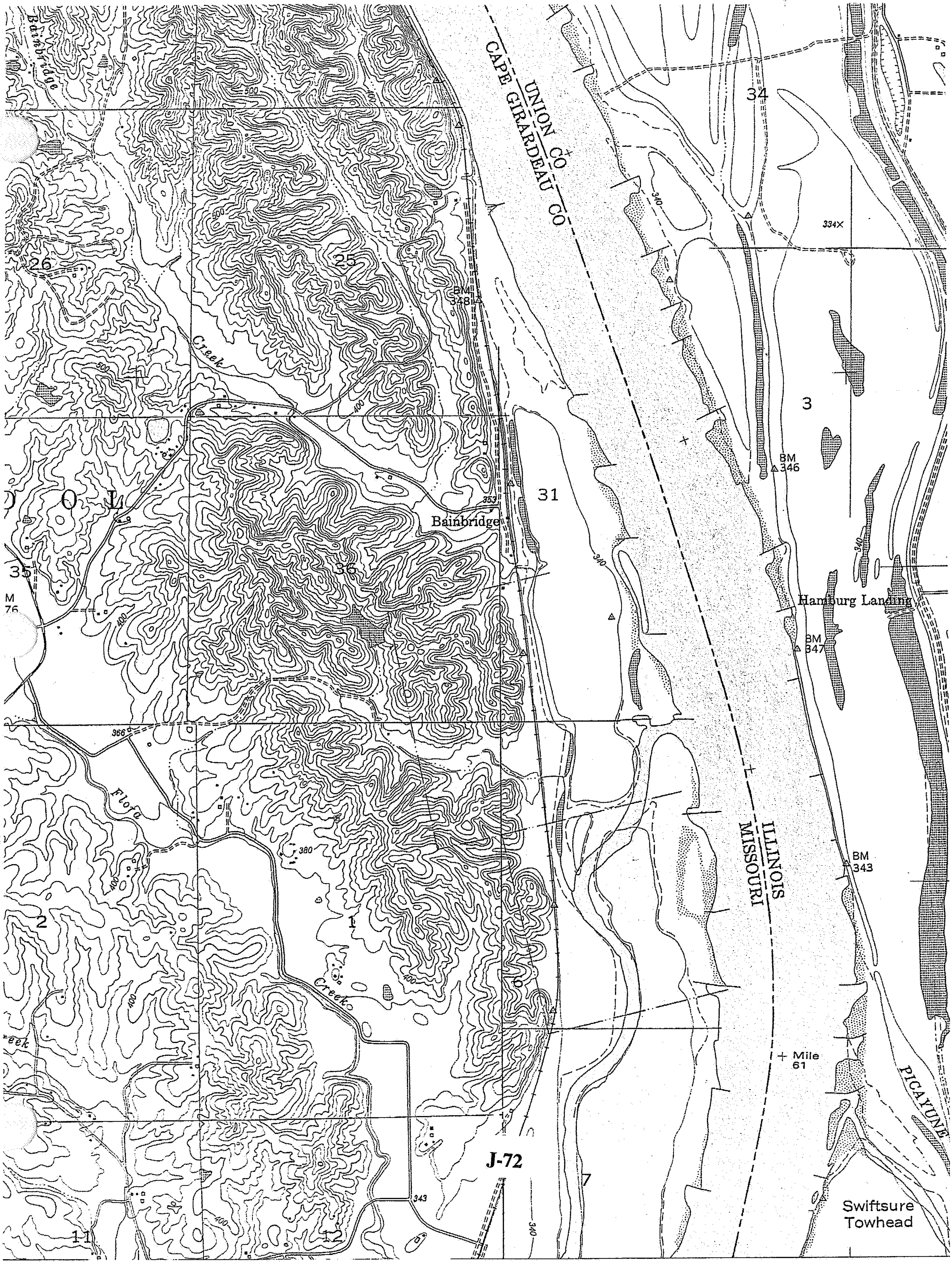

Bainbridge
UNION CO
CAPE GIRARDEAU CO
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334X
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25
BM 348
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BM 346
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Bainbridge
353
35
36
Hamburg Landing
BM 347
340
366
Flora
380
ILLINOIS
MISSOURI
BM 343
2
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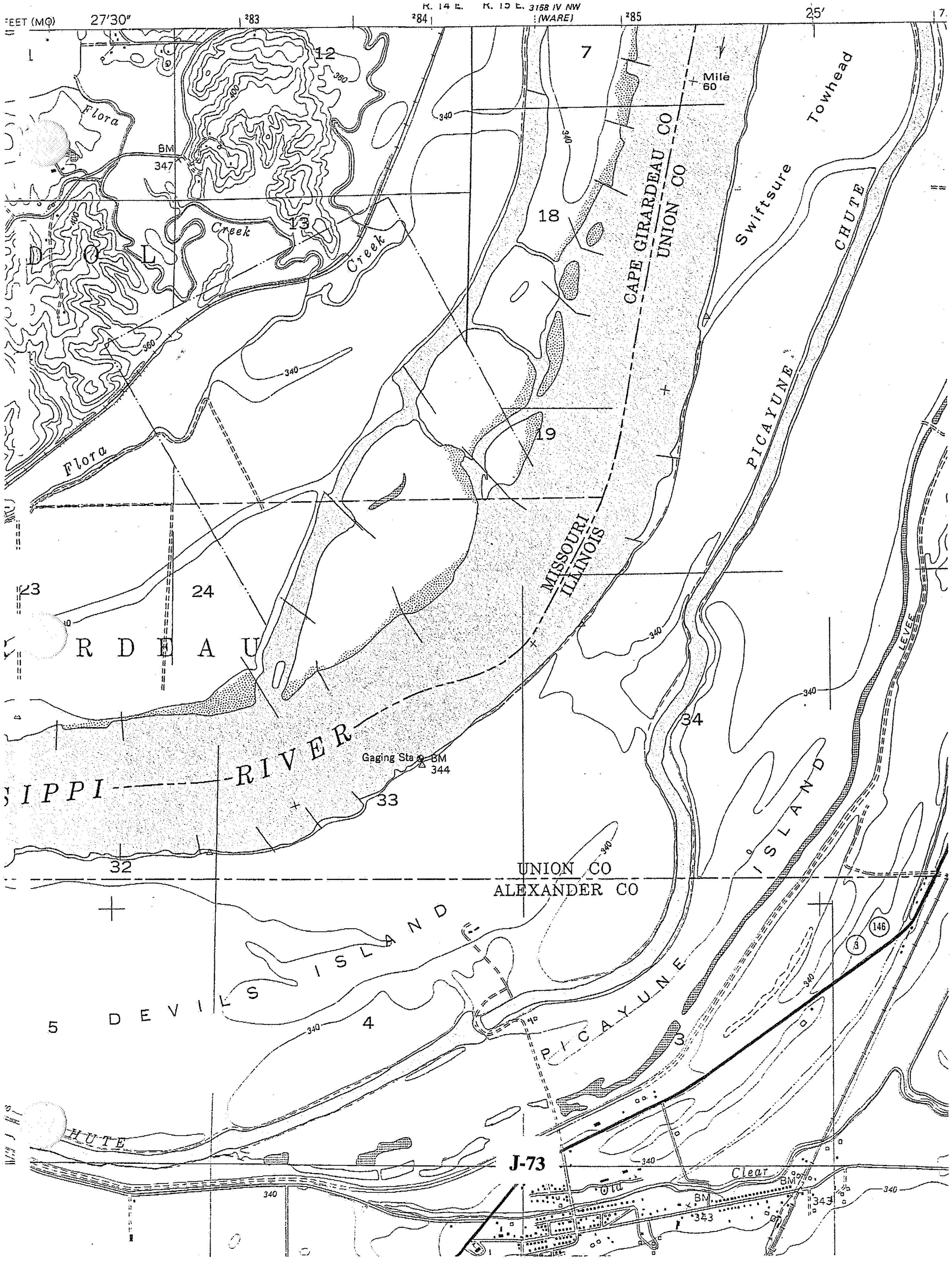
Creek
6
Mile 61
PICAYUNE
J-72
7
343
Swiftsure Towhead
11
12


R. 14 E.
R. 15 E.
3158 IV NW
(WARE)
FEET (MO)
27'30"
283
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25'
Mile 60
Flora
Creek
Flora Creek
CAPE GIRARDEAU CO
UNION CO
Swiftsure Towhead
PICAYUNE CHUTE
MISSOURI
ILLINOIS
R D E A U
SIPPI RIVER
Gaging Sta
BM 344
BM 347
UNION CO
ALEXANDER CO
DEVILS ISLAND
PICAYUNE ISLAND
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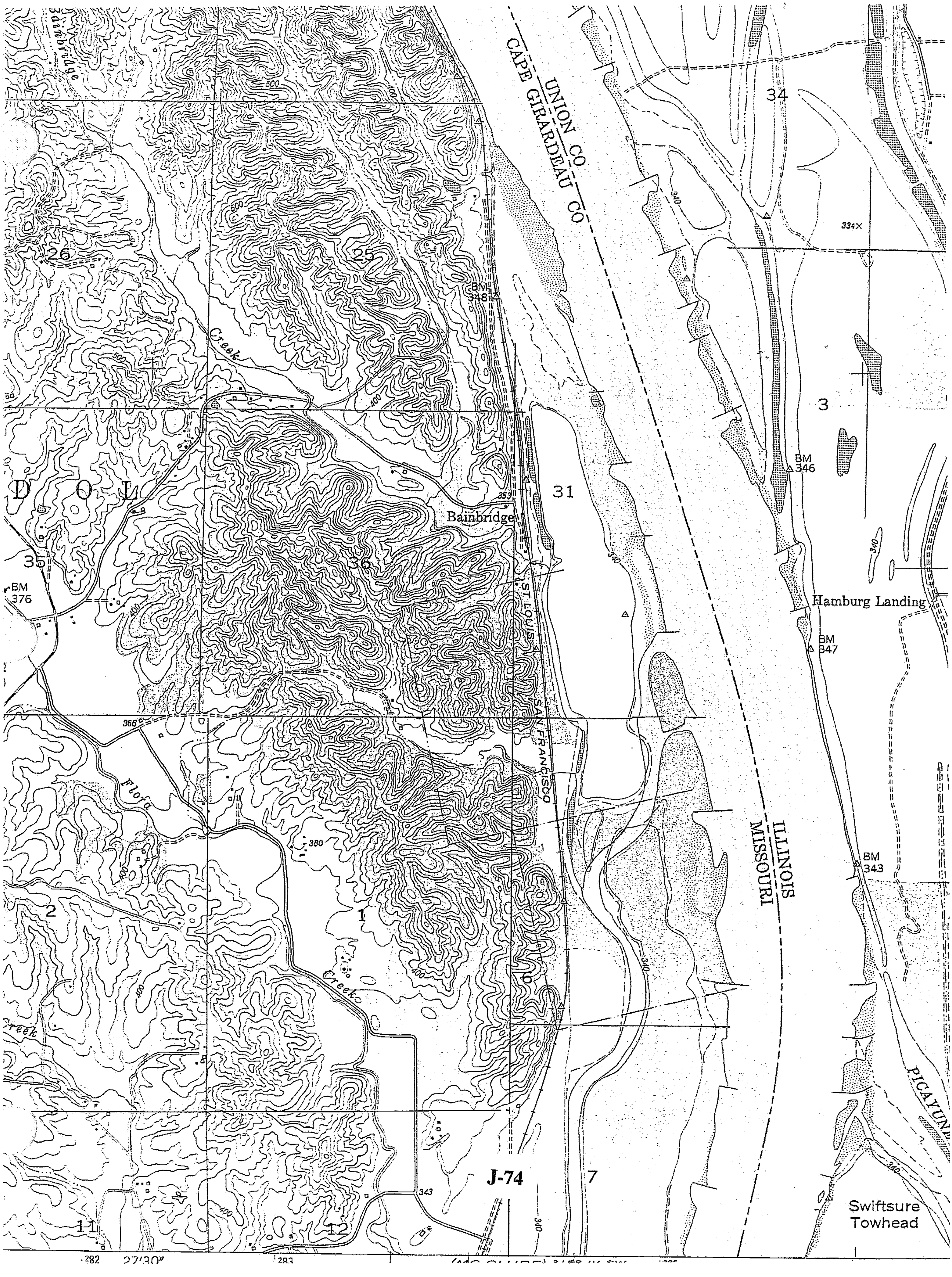
UNION CO
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Hamburg Landing
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ST LOUIS SAN FRANCISCO
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Flora
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ILLINOIS
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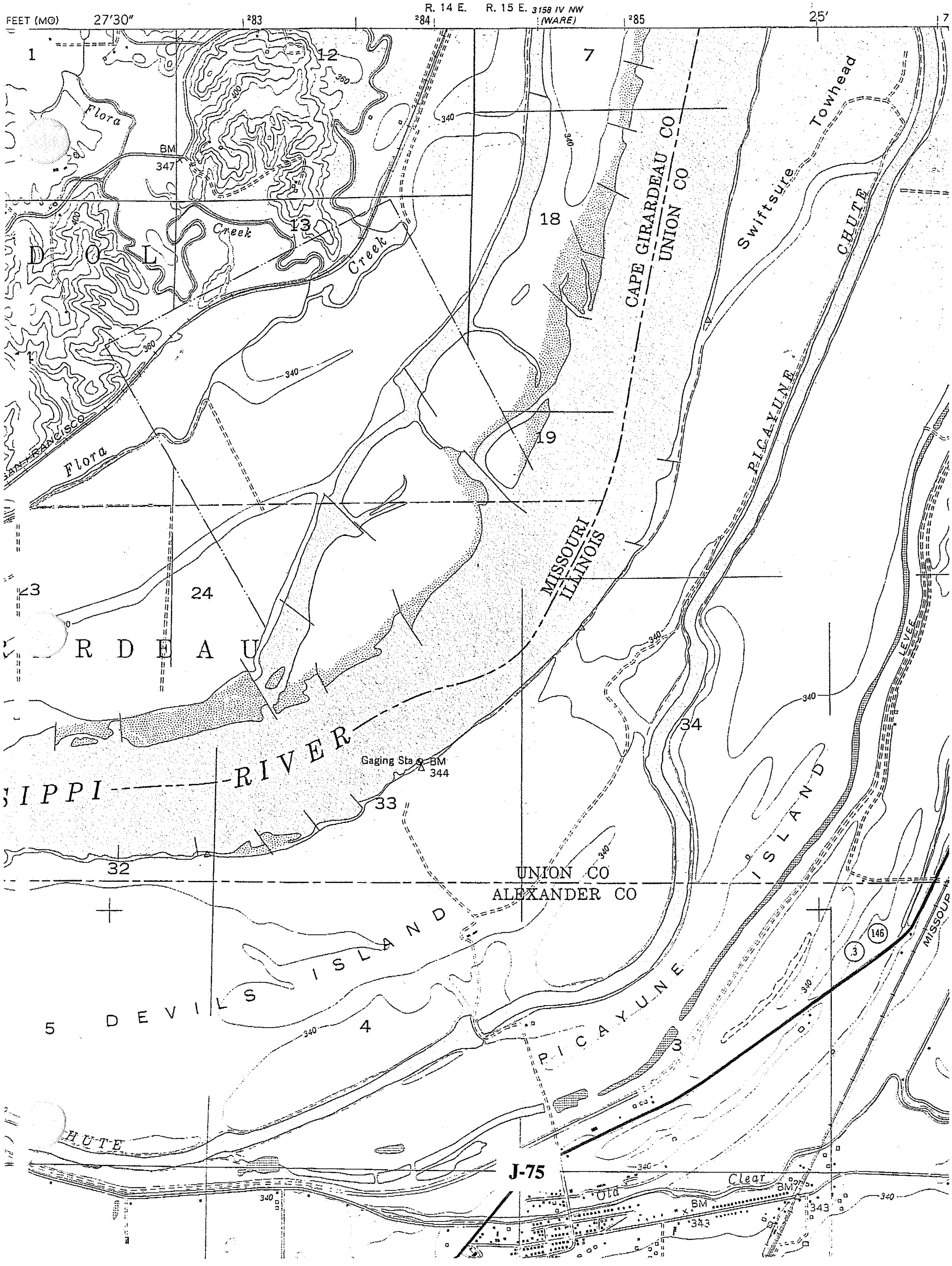
Swiftsure
Towhead
282
27'30"
283


FEET (MO)
27'30"
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R. 15 E.
3158 IV NW (WARE)
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Flora
Creek
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SAN FRANCISCO
CAPE GIRARDEAU CO
UNION CO
Swiftsure Towhead
CHUTE
PICAYUNE
MISSOURI
ILLINOIS
R D E A U
SIPPI RIVER
Gaging Sta BM 344
UNION CO
ALEXANDER CO
DEVILS ISLAND
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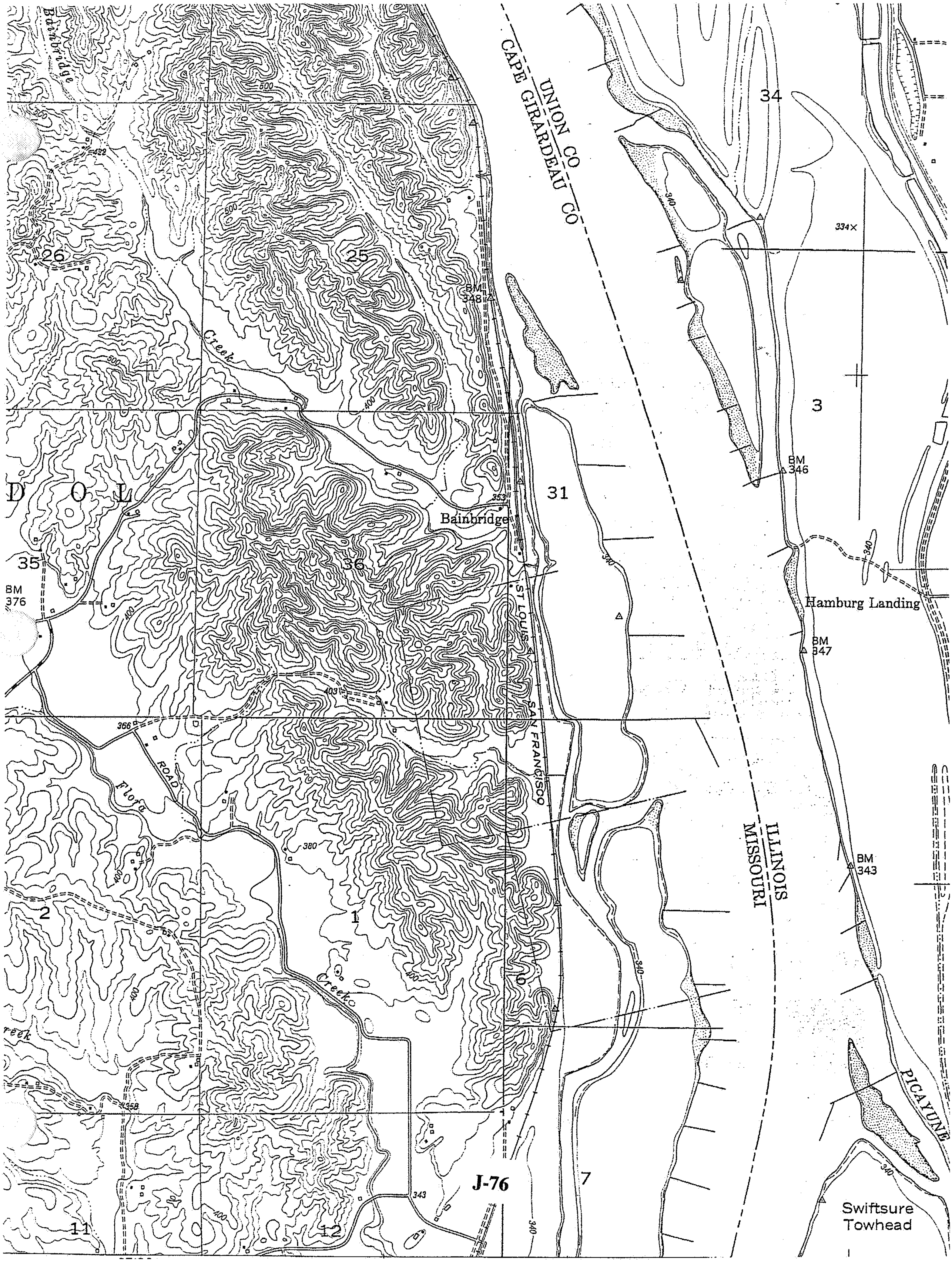
Bainbridge
UNION CO
CAPE GIRARDEAU CO
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D O L
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Bainbridge
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BM 376
ST LOUIS SAN FRANCISCO
Hamburg Landing
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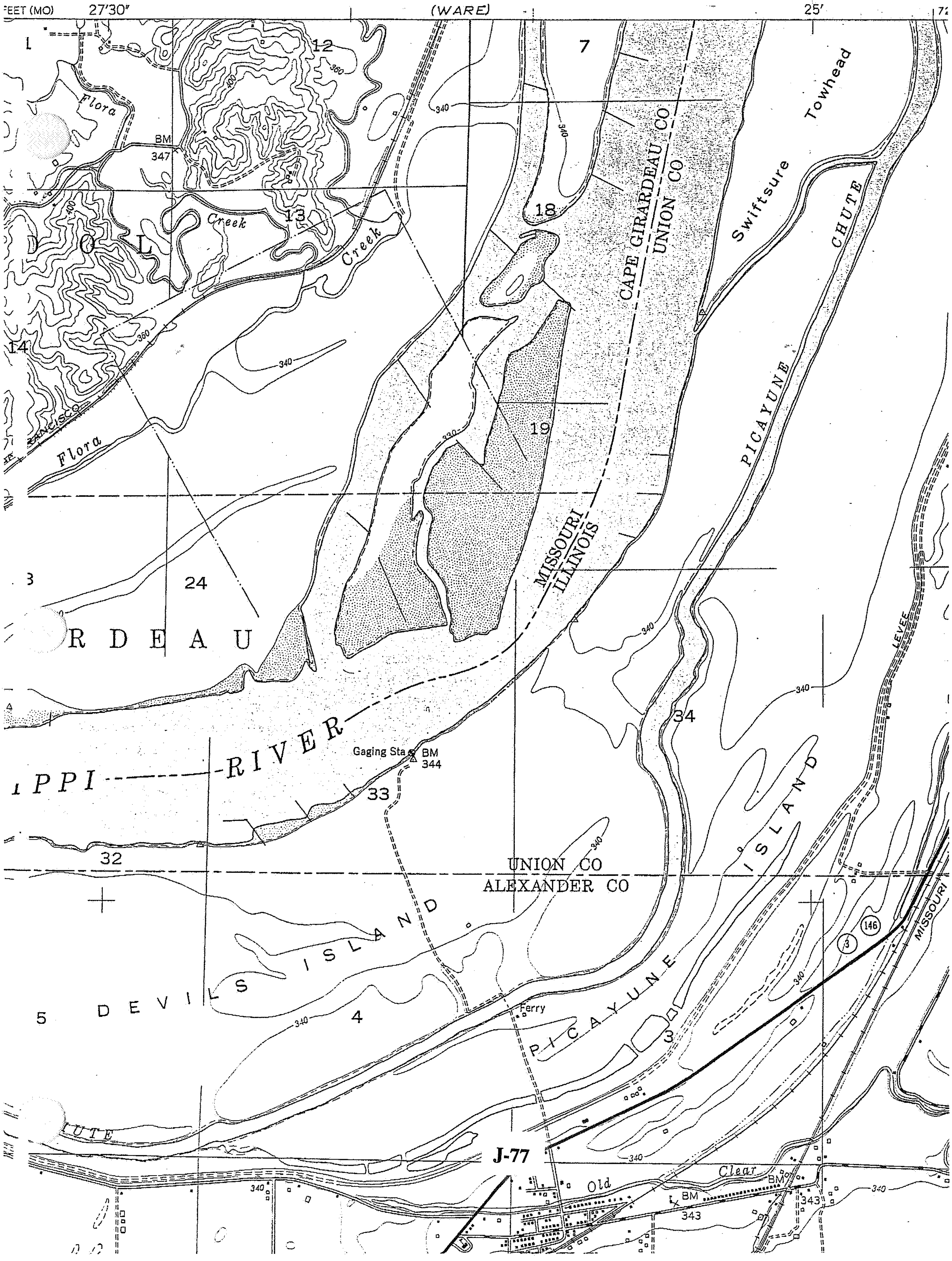
FEET (MO)
27'30"
(WARE)
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Creek
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Creek
CAPE GIRARDEAU CO
UNION CO
Swiftsure
Towhead
CHUTE
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Flora
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PICAYUNE
MISSOURI
ILLINOIS
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R D E A U
LEVEE
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Gaging Sta
BM
344
RIVER
IPPI
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ISLAND
32
UNION CO
ALEXANDER CO
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MISSOURI
DEVILS ISLAND
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PICAYUNE
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Clear
Old
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400

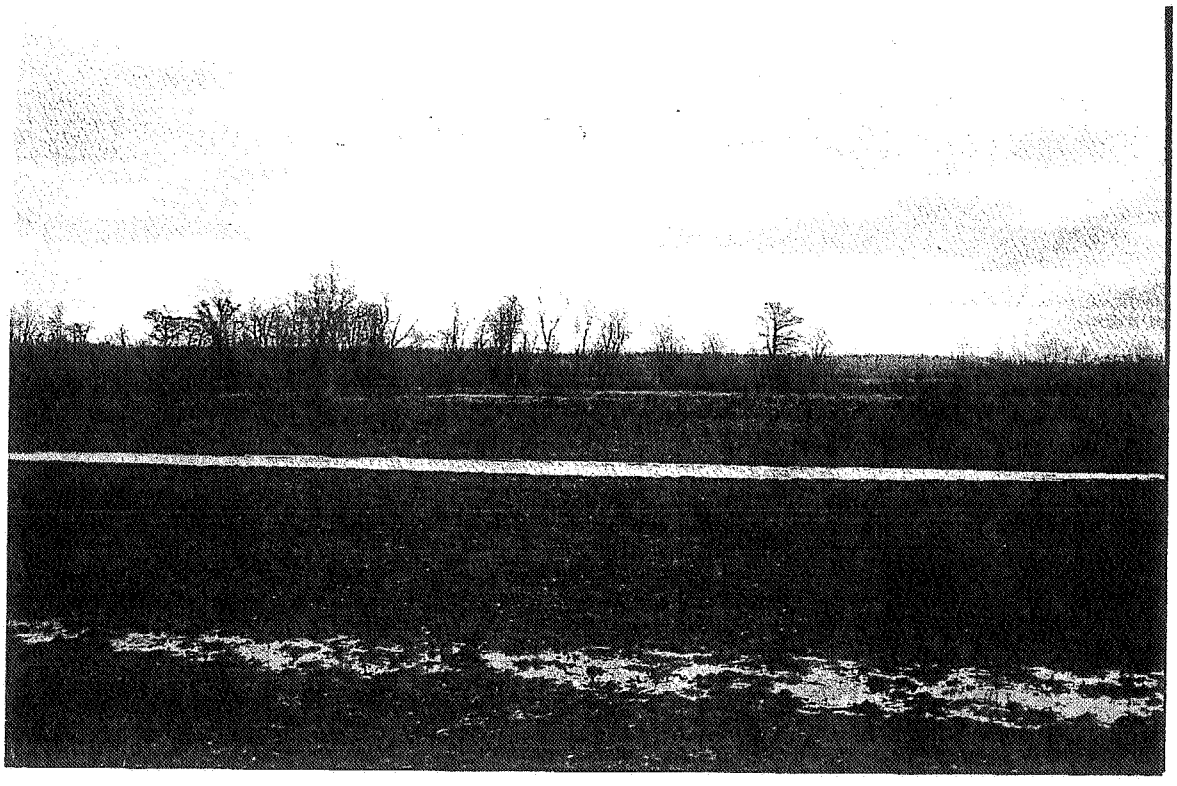
Appendix 2

Site Visit Photographs

Schenimann Chute
Looking East/Southeast Across Flora Creek
from Railroad Crossing of County Road 653

Looking Southeast Across Farmland from RR Paralleling
Flora Creek and Schenimann Chute

Railroad Paralleling Schenimann Chute to the West.
Looking Northeast from Site North/Northeast of County Road 653



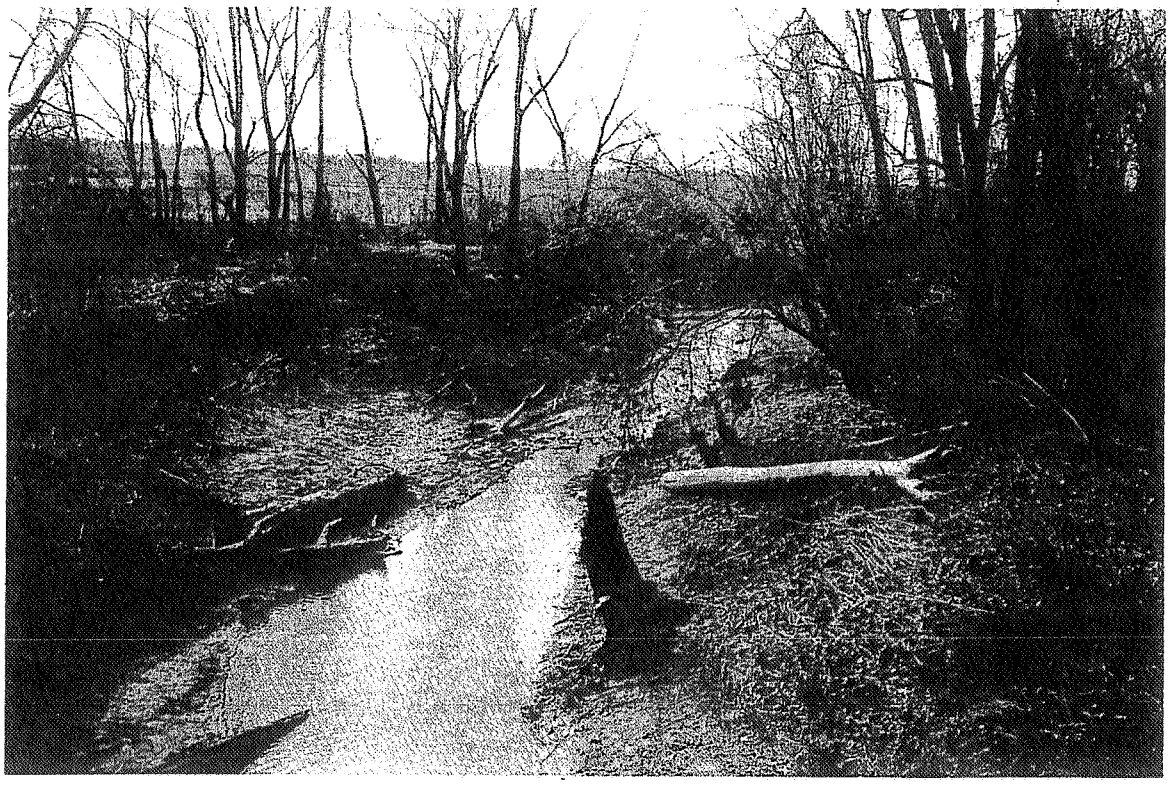
From RR Track West of Schenimann Chute Looking Southeast.
Tree Line is Along Flora Creek.

Looking Northeast Along RR Tracks Located
West of Schenimann Chute

Railroad Crossing for Farming Equipment Entry to Ground Adjacent To
Schenimann Chute. Access Roads Are Not Public.

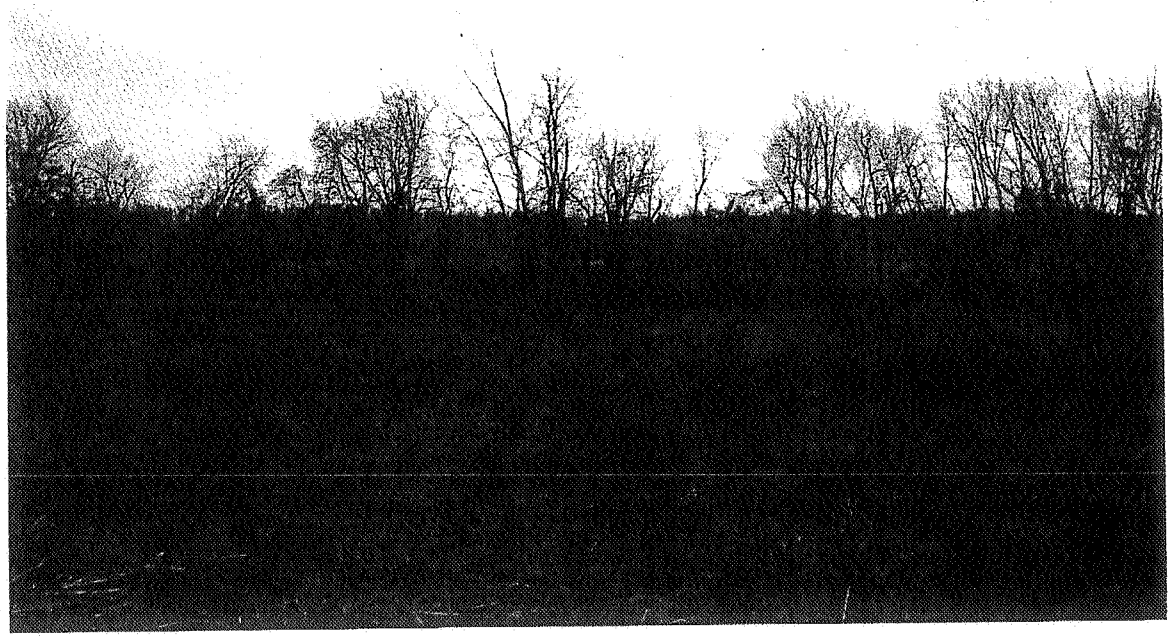
Railroad Bridge for Crossing Little Flora Creek At
Track Mile 125.6 Looking East

Railroad Crossing of Little Flora Creek
Looking North/Upstream

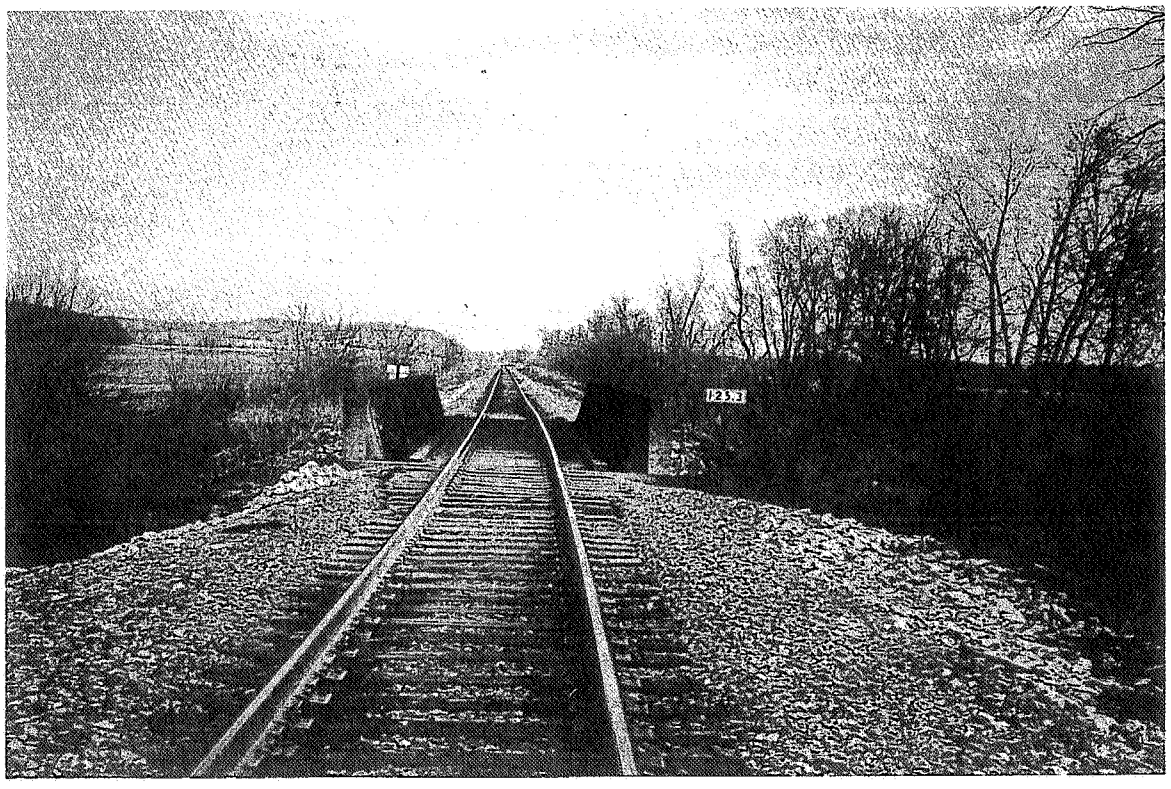


Railroad Crossing of Little Flora Creek
Looking South/Downstream

Railroad Crossing of Flora Creek. Railroad Crossing for Farm Equipment Located South of Flora Creek. Looking Northeast.



Looking East/Southeast from RR Crossing Established for Farming Equipment South of RR Crossing Bridge for Flora Creek. Flora Creek Located Adjacent to Tree Line. Schenimann Chute in Background.



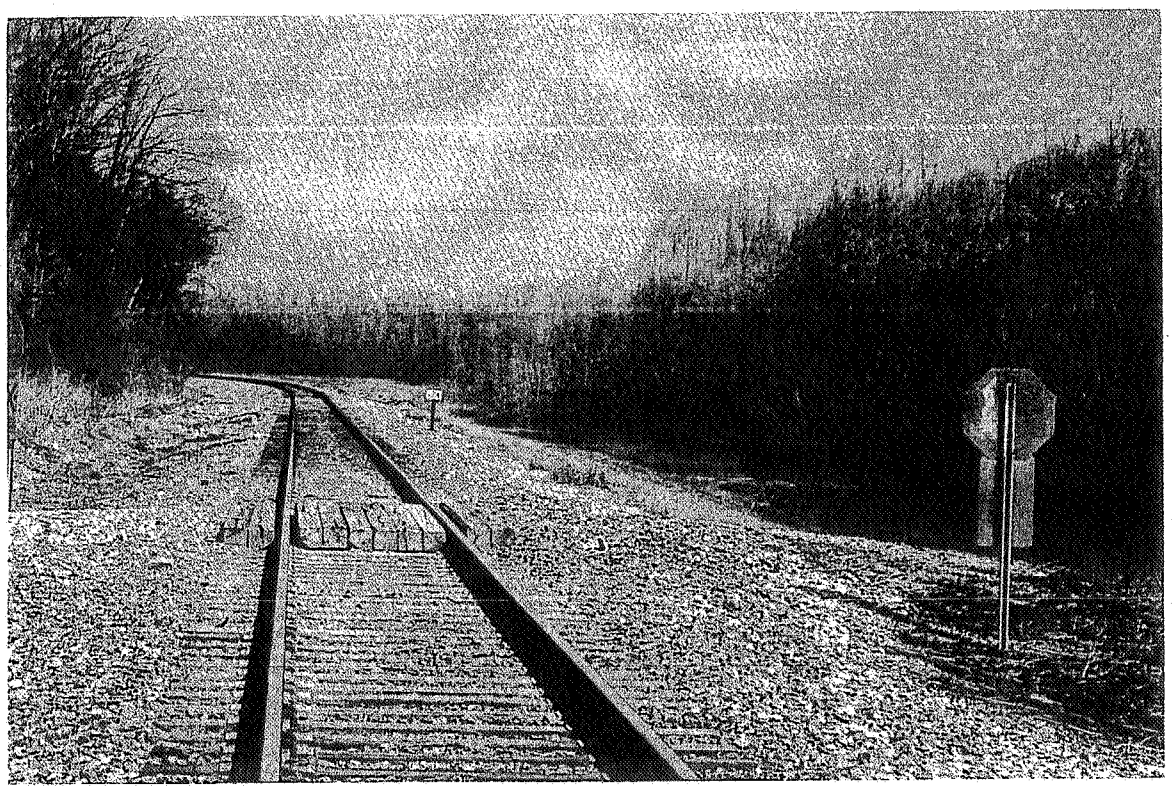
Railroad Crossing of Flora Creek Looking Northeast.
Track Mile 125.3

Railroad Crossing at Flora Creek. Debris Field Washed Up Against Tree on Upstream Side of Bridge. Debris Identified as Kitchen Appliance (i.e. Refrigerator).

Looking Northeast from RR. Private Access Road for Farm Machinery. Road Leads Back to County Road 651 West of Schenimann Chute

Private Access Road Leading to County Road 651 Which Is
Located West of Schenimann Chute

End of Private Access Road Connected to County Road 651.
Road Terminates in Agricultural Fields Adjacent to Schenimann Chute



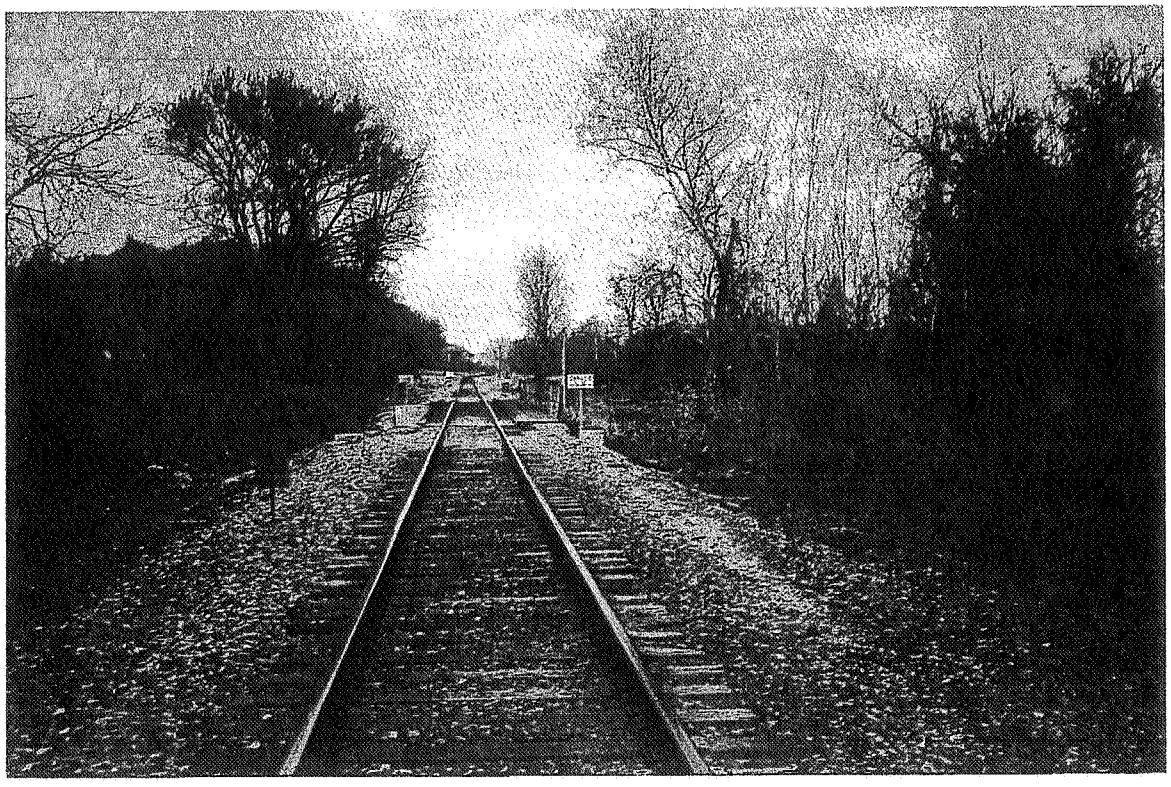
Private Access Road At RR Track Mile 124. Originates from County Road 651 and Terminates on East Side of Tracks Adjacent to Northern Section of Schenimann Chute. Not Open to General Public and Not Maintained.

Railroad Signal Batteries Discarded Along Tracks North of Track Mile 124. Adjacent to Northern End of Schenimann Chute.

Private Railroad Crossing at Northern End of Schenimann Chute.
Not Open to the Public. Schenimann Chute Located to the Right of RR. Looking North.

Looking at Northern Section of Schenimann Chute from RR Tracks.
Looking East.

RR Track Mile 123 Looking East at Bainbridge Creek (First Tree Line)
and Entrance to Schenimann Chute/Upstream Side from Mississippi River
(Treeline in Background)



Railroad Bridge Crossing Bainbridge Creek – Looking North.

Bainbridge Road (County Road 830) Crossing RR Tracks North of Schenimann Chute.
Road Is No Longer Public and is Blocked/Gated to the West Approximately ¼ Mile.